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A Return to Master Planning

Highlights

Theory of Paradigm Shift?

Campanian Region Speleothems

Discovering Thoughts, Inventing Future

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A Return to Master Planning in Dar es Salaam: A Misconception of the Theory of Paradigm Shifts?

By Dr. Samson Elisha Kasala
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Abstract- Recent trends have shown that, cities of developing countries have been switching from one urban planning approach to another and this trend will continue. The methodology adopted involved a review of scondary data sources, interviews and analysis.The findings of this research present three areas of discourse. First, the demise and resurgence of conventional approaches is a worldwide recurring phenomena. Secondly, the switch/return to master planning approach in Dar es Salaam was premature and largely resulted from a misconception of the theory of paradigm shift. Thirdly, the claim that SUDP is ill-suited to guide the process of urban change, is more of a misleading generalization than a reality. The utility of SUDP has to be examined not only from practice but also from core theoretical and conceptual tenets, laws and procedures governing such an urban planning practice.

Keywords: master planning (MP), strategic urban development planning (SUDP), paradigm shift.

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Keywords: master planning (MP), strategic urban development planning (SUDP), paradigm shift.

I. Introduction

Strategic Urban Development Planning (SUDP) is a stakeholder-based approach to urban planning. It was adopted in Tanzania in 1992 following criticisms against the "master planning approach". The SUDP approach, is situated within a wider discourse of urban planning and City Development Strategies-CDSs (UN-Habitat, 2004). Strategic urban development planning originated in the global North (the developed world) in the 1950s (Bryson & Roering, 1988; Watson, and Gonzalez, 2005 and Graaf, 2005). Since then, it has spread into many other parts of the world, including Tanzania. The spread to other parts of the world was possible through urban management efforts by UN-Habitat, Earth Summits on Human Settlements and Environment, and the World Bank-linked organization such as Cities Alliance (Watson, 2009; UN-Habitat, 2009).

In Tanzania, SUDP was introduced as an initiative of the Urban Management Programme (UMP) namely Environmental Planning and Management (EPM) in the early 1990s (UN-Habitat, 2009, p.66). The adoption of the SUDP approach was based on the assumption that it would be more effective in guiding urban development planning. It was also assumed that SUDP would be more responsive to the challenges of sustainable urban development than the technocratic master planning approach.

Surprisingly, after about seventeen years (1990-2007) of SUDP introduction and implementation in Dar es Salaam, SUDP was abandoned, not by city stakeholders, but rather by only the Ministry of Lands Housing and Human Settlements Development (Kasala, 2013, p.1).

The decision to abandon SUDP and hence return to master planning has left numerous unanswered questions among urban development planning scholars and stakeholders. Many are wondering: What has gone wrong with SUDP? Why has it been abandoned?. Could there be other issues beyond the SUDP process itself? Were our urban planning and management institutions adequately prepared to receive and implement SUDP? How has SUDP been or not been used in Dar es Salaam? These questions prompted indepth studies to answer. In contributing to that, the purpose of this paper was to examine the dynamics underlying shifts in urban planning approaches in Dar es Salaam on the one hand, and the influence of theory on such shfts, on planning decisions and practice, on the other.

II. Methodology

The following methodological approach was adopted in examining dynamics underlying the shifts in Urban Planning approaches in Dar es Salaam.

a) Review of secondary data sources

A host of information exists regarding the implementation of convetional and alternative planning approaches in Tanzania generally and Dar es Salaam in particular. In order to establish what transpared in both approches, the review of existing secondary data sources was necessary. A review was made on data sources to generate information for answering questions related to (i) the shift from master planning to strategic planning, (ii) the SUDP process in Dar es Salaam, (iii) Challenges of the SUDP process and (iv) the return to master planning.

The secondary data sources reviewed and analysed included: the 1979 Dar es Salaam master plan; the 1999 Dar es Salaam City's profile, Strategic Urban Development Planning (SUDP) reports (voulmes I to VII) covering stages of initiation, implementation, and evaluation in Tanzania. It also included: the 2006 guidelines for prepaeration of planning schemes, the

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Urban Planning Act No.8 of 2007, Urban planning Orders and Seculars from the Ministry of Lands, Housing and Human Settlelements Development (MLHHSD); written documents in forms of: books, journal articles, research and project documents, minutes of meetings, letters, newspapers, and Terms of References. The review of secondary data sources was also instrumental in providing the:-

i. Chronology of events in the planning and management of Dar es Salaam City using master planning and strategic planning approcahes, (see Table 1),
ii. Views and perceptions of stakeholders on the implementation of SUDP strategies,
iii. Planning decisions made during the implementation of the SUDP process

b) Interviews

Interviews were held with identified respondents, and informants both in institutions and local communities. Respondents interviewed were from academic institutions, local authorities, Professional firms, NGOs and CBOs that took part at various stages of the SUDP process in Dar es Salaam. Key informants were identified as individuals who were knowledgeable of the SUDP process in their communities, and who could provide meaningful information on what influenced the adoption of SUDP and later on, a retrun to master planning. Content analysis was applied in generating the type and quality of information required.

III. Findings

a) From master planning (MP) to strategic urban development planning (SUDP)

The history of master planning in Dar es Salaam City, is traceable way back to the colonial era. During that time, the Arabs, Germans and British used master planning to guide mainly the physical development of Dar es Salaam. The first master plan namely "physical development plan for Dar es Salaam" was prepared by the Arabs, under Said Majid, then the Sultan of Zanzibar (Kironde, 1994)

The chronology of events in Table 1 shows that the first master plan started to be implemented in 1866. It was stopped after the Sultan's death in 1870 (Halla 1997, p. 14). Taking over from the Arabs, the Germans in 1891, started to implement the Arabs' physical development plan with some improvements. Based on the improvements made on the Dar es Salaam's physical development plan, the Germans developed Dar es Salaam as the capital of their colonial administration of then German East Africa, which included Tanganyika (the today's Tanzania mainland), Rwanda and Burundi. Growth challenges of Dar es salaam city spurred the preparation of the 1949, 1968 and 1979 Dar es Salaam master plans.(see for example Kironde 1994, Halla 1997, and Kasala 2013). However, implementation processes of these plans were not smooth. At some point plans implemetation were considered as non priority. Consequently they were ignored or completely abandoned. Table 2 summarises the implementation status of of the Dar es Salaam City's Plans from 1930s to 1990s.

The failures in implementing the Dar es salaam master plans over time, relates to what writers in urban planning have termed as "evolution process in planning thoughts" that began way back in the 1950s (Todes, 2009; Watson 2009, Kasala 2013). Through these thoughts, it has been argued that master planning, as an approach and tool for urban management, cannot be applied across the board to guide urban development. This is derives from the varying spatial, social, economic and political contexts in which urban planning is conceptualised and practised. In this case, Dar es Salaam is not exceptional.

Table 1: The Planning and Management of Dar es Salaam City: Chronology of Events

S/N	Event	Period
1	First physical development plan for Dar es Salaam was prepared by Arabs, under Said Majid, then the Sultan of Zanzibar	1840s
2	The first physical development plan for Dar es Salaam prepared by Arabs started to be implemented	1866
3	Implementation of the physical development plan for Dar es Salaam stopped due to Sultan's death	1870
4	Implementation of the first physical development plan for Dar es Salaam (prepared by Arabs), but started under the Germany rule but with some improvements.	1891
5	The status of Dar es Salaam was raised from a town to a municipality by the British. The first Master plan for Dar es salaam was prepared, and formal institutional arrangements for its implementation were founded. These involved enactment of the *1923 Land Ordinance*, the *1956 Town and Country Planning Ordinance*, and the *Dar es Salaam Municipal Ordinance of 1947*. It also involved establishment of the Department of town Planning to enforce the master plan and the related ordinances.	1949
6	The second Dar es Salaam Master plan was prepared by a Canadian, Toronto based firm, called Project Planning Associates Ltd.	1968
7	The third Dar es Salaam Master plan was prepared by a Canadian, Ontario-based firm called Marshall Macklin Monaghan Ltd.	1979
8	Adoption of a new planning approach due to evolution of planning thoughts that began way back in 1950s (Watson, 2009, Todes, 2009, UN-Habitat, 2009)	1992
9	The third Dar es Salaam Master Plan legally expired	1999
10	The beginning of implementation of the new guidelines for urban development planning and management	2006
11	Enactment of the Urban Planning Act No. 8 of 2007	2007
12	A return to Master Planning	2007-to date

Source: Kasala E.S, (2013): Operationalizing Strategic Urban Development Planning: A case of Dar es Salaam City, Tanzania. An unpublished Ph. D. Thesis, University of Dar es Salaam.

Table 2 : Implementation Status of the Dar es Salaam City's Plans: 1930s -1990s

Name of Plan and Planning Period	Implementation Status	Remarks
Dar es Salaam Town Plan, (commonly known as the *Pashen's Plan*)1930s to mid 1945	Was partly implemented. However, by mid 1944, was found to be conflicting with so many of then the existing township establishments (e.g open spaces) thus required major revisions.	Ignored and a new plan was prepared
The *Leadbeater plan*[i], 1945 to 1948	Was gazetted in November 1946. However no efforts were made to implement the plan. The reasons for this were: anti-planning tendency in the government; personality clashes among officials; Municipal Authority and the Department of Town Planning were not yet in place to enforce the plan. The plan had a considerable influence on the decisions to site a number of planning schemes[ii] in Dar es Salaam	Abandoned in 1947
The 1949 Dar es Salaam master plan	Incorporated and implemented most proposals of the *Leadbeater plan*. Its new proposals were hardly implemented	Adopted by the 1950 Municipal Authority
The 1968 Dar es Salaam master plan	It was hardly implemented despite its impressive proposals. The reasons were: it was not justified[iii] and diverged from the city's (political, economic and social) development realities[iv] of 1960s and 1970s	Ignored in favour of a government development programme[v]
The 1979 Dar es Salaam master plan	No deliberate efforts were made to implement its main proposals. This was due to inadequate resources at the period of gathering economic hardships and stringency. These hardships were in terms of rapid population growth, limited development expenditure, and a weak planning machinery	Ignored
The 1999 Dar es Salaam city's SUDP	Fairly implemented, encountered formidable challenges, and has been dropped.	Calls to abandon SUDP

Source: Kasala E.S, (2013): Operationalizing Strategic Urban Development Planning: A case of Dar es Salaam City, Tanzania. An unpublished Ph.D. Thesis, University of Dar es Salaam.

Following the failures in implementing master plans in Dar es Salaam coupled with the evolution in planning thoughts, Tanzania adopted SUDP as an alternative approach to planning and managing the urban environment. SUDP was adopted in preference to master planning approach based on grounds, *inter alia* that, issues that needed to be addressed in cities, were beyond the competence of conventional (master) planning approaches (UNCHS, 1993, 1994).The key aim was therefore to address the weaknesses of master planning (UN-Habitat, 2009, p.64; 67) in a manner that enhances the capacity of stakeholders to effectively plan and manage the urban environment (UN-Habitat, 2004; Samson, 2004).

b) The implementation of SUDP approach in Dar es Salaam

Since its introduction, strategic urban development planning has been implemented through various urban development strategies. They include: Solid wate management (Majani, 2000, Samson 2004), improving unplanned settlements (Sakijege, 2006), community infrastructure upgrading, and guiding urban growth (Kasala, 2013), managing urban expansion (Halla, 1997) to mention but a few. The implementation of SUDP was met with a number of challenges as elaborated in the sections that follow:

i. It was not possible to implement all the priority projects and strategies due to limited financial resources. Consequently some projects and strategies were left unattended by stakeholders. At city level some critical environmental issues or problems have not been addressed to date. They include: construction of municipal and city sanitary landfills, construction of the proposed city-wide sewerage system, air quality management and urban transport, managing coastal resources and urban renewal.

ii. Until 2007, the SUDP process had not been integrated into the current set-up of urban development planning. In this regard, its sustainability as an alternative approach to urban development planning could not be guaranteed.

iii. SUDP lacked legislative and institutional mandate to practice urban planning. This derived from the fact that then the planning law (*the Town and County* Planning *Ordinance, 1961*) was silent about the SUDP process until 2007 when it was reviewed into the current Urban Planning Act No.8 of 2007.

iv. There was inadequate awareness and lack of appreciation of SUDP knowledge.

v. Inadequate awareness and lack of appreciation of SUDP knowledge among stakeholders resulted into misconceptions, contradictions and varied perceptions on various aspects of SUDP. The misconceptions and contradictions affected the performance of SUDP (See for example Kombe and Kreibich 1997, Majani 2000, and Kasala 2014)

vi. Problematic institutional arrangements for SUDP. The institutional framework within which SUDP activities were carried out proved to be problematic. It was seen as operating parallel to the existing formal institutional structures (see for example Halla 1997, Kombe and Kreibich 1997, Majani 2000, Kasala 2013,):

c) The return to master planning

The return to master planning, amid the SUDP process was prompted by two factors, research has established. The factors were identified as "weaknesses of SUDP" on the one had, and "issues beyond the SUDP" on the other.

i. *Weaknesses of SUDP*

a. The first, weakness of SUDP framework was purpoted to be the difficulty of showing how attracted activities in each development area could be turned into a single and acceptable future land-use map (Halla 2002, p.29). As such it is difficult to use SUDP to produce future land use plans with fixed or predetermined land use. This limitation, according to mainstream land use planners, makes SUDP unsuitable for land use planning as well as development control. However, recent research provide that this limitation doesn't hold given the breakthrough in mapping technology using Geographical information Systems, and the need to change the form and content through which planning outputs are persented (see for example Kasala, 2014, p.15)

b. The second weakness of SUDP is the concern on time and resources spent to produce outputs. Research has revealed that the Dar es Salaam City's strategic urban development planning process was noted to have taken a relatively longer time to prepare with considerable input of financial resources as compared to master planning (URT, 2007). The time and resource concerns created confusion in the Ministry of Lands for Housing and Human Settlements Development (MLHHSD). There was confusion in the sense that while there were no financial resources to continually fund SUDP activities on the one hand; the city was rapidly growing with inadequate guidance, on the other.

This situation compelled the MLHHSD to find ways to return to master planning. One of the first steps of a return to master planning was to formulate guidelines that could assist urban planners, related practitioners and other stakeholders to plan, approve, implement, and monitor development in their respective areas of jurisdiction (URT, 2007).

The situation in Dar es Salaam is similar to situations in other countries. In the United Kingdom (UK) for example, strategic urban planning approaches were

dropped on resource-use efficiency grounds. That is, they were considered as unnecessarily lengthy, time consuming and, too expensive to afford (see for example Healey 2003; Giddings and Hopwood 2006).

Based on these issues, strategic approaches have been construed as inappropriate in producing immediate results, urgently needed to address issues in fast growing cities (Healey, 2003).

c. The third weakness of SUDP is related to stakeholders' capacity to implement proposals. The Dar es Salaam experience has shown that, stakeholders generate strategies and projects to address critical issues but end up being unable to implement them. This situation was found to be caused by stakeholders' limited financial resources; lack of legislative mandate to practice SUDP, and lack of visible commitment and perseverance in support of the functioning of working groups. This weakness dominates to date. For example, the state of inadequate financial resources has continued to constrain implementation of projects that require heavy initial capital investment. They include: the construction of Sanitary landfills and sewerage systems in Dar es Salaam.

d) Issues beyond the SUDP

i. Issues beyond the SUDP were several. However, the most critical ones were identified as: institutional efforts and training background of professionals. One of institutional efforts was the Ministry's (MLHHSD) directive to return to traditional master planning approach(See for example Kasala, 2013). The directive resulted from the MLHHSD's Annual General Meeting conducted in Mbeya Municipal Council from 23rd to 24th February 2006. The meeting resolved that:

"Master plans should be the official urban planning and management tool and that, guidelines for their preparation should urgently be put in place URT(2007, p 5)".

That being the case, the decision to return to master planning and the formulation of the 2007 guidelines for urban planning were part of institutional efforts coordinated by the MLHHSD.

ii. Regarding training background, this study has found that, the majority of professionals charged with the responsibility to coordinate and implement the SUDP process were simply mainstream land-use planners. These were trained not as strategic planners, but rather as master planners. These considered themselves incompetent to practice SUDP. In this regard, they perhaps found an easy way to do planning by moving from practicing SUDP to master planning, where they are not only qualified but also experienced and comfortable.

These factors coupled with the dominance of master planning in the SUDP process, have certainly paved a way for the return to master planning.

IV. Discussion

a) Theory as a foundation for Practice

Scholars have argued that urban planning practice is informed by certain thinking commonly expressed by theories (see for example: McConnell, 1981 and Taylor 1998). Taylor (1998) concurs with the wide spread assumption that urban planning practice is influenced by common and dominant urban planning paradigms. These scholarly views are reiterated by Friedmann's (2003) position that "there is no planning practice without a theory about how it has to be practiced". He continues ..... "that theory may or may not be named or present in consciousness, but it is there all the same" (Friedmann 2003, p.8). In this context, when we debate about master planning or alternative urban planning approaches, as a state policy instruments designated to protect the public interest, we have in mind a theory of planning that informs respective planning practices.

Evidence of doing urban planning without proper reference to concrete theoretical base and paradigm shift exist. Proponents of this way of doing planning take advantage of the question raised by Friedmann (2003) "why do planning theory?" Advocates of planning theory (Watson 2002, Innes 1995) point out the danger of ignoring theory, they warn that" planning runs the risk of embracing changes without an appreciation of the knowledge (paradigms and theories) that inform such changes".

This means an understanding of planning paradigms and/ or the theories on which planning practice is based, is crucial.

b) The Theory of Paradigm shifts

Scholars have attempted to explain the planning process and the time factor in relation to paradigm shifts (Tugwell 1974; Friedmann 1993; Kombe and Kreibich 1997; and Watson 2009). Scholars argue that it takes time and sometimes a century for a new paradigm to be understood and correctly applied such that it replaces a previously dominant paradigm.

Referring to the time factor, until 2007 when it was abandoned, the SUDP process was in Dar es Salaam for seventeen years only. This time is less than two decades. According to the scholarly views, seventeen years is a very short period to allow for a complete paradigm shift process to occur, taking stock of experiments, research and knowledge dissemination works involved. Far more, time was needed to influence acceptance of a new paradigm by the academic circles, the general public, the political system, economic concerns, pressure groups and overall citizens.

In such a short period (17 years), the SUDP as a new approach, may have become popular among certain groups of stakeholders, but not dominant enough to replace the older one (the master planning) and render it ineffective. This means, instead of abandoning SUDP, more time was needed to allow for a complete paradigm shift to occur. This would have involved: continued rounds of research, knowledge dissemination, and acceptance by the scientific and consummer communities.

The practice of abandoning one planning approach and switching on to another is not new. It is a recurring phenomena worldwide. It started occurring in the Europen and American contexts in the early 1920s/30s and 1950s respectively (see for example Healey, P *et al.,* 1997; Mastop1998; Salet and Faludi 2000; Albrechts *et al.*, 2001). The question here is, were such paradigm shifts influenced by "theory governed realities?" The answer is hardly yes. Most shifts were influenced and governed by other factors than theory. The factors included professional clushes resulting from complications that arose from issues of plan contents and their interpretation into actions (Albrechts, 2001, p.306), market forces **(McConnell 1981),** and political pressure **(Steinberg, 2005, p.76)**

While writers (McConnell1981, Taylor 1998 and Friedmann2003) warn against the risk of practising urban planning without reference to theory, the situation obtaining in Dar es Salaam presents a complete disregard of the same.

When time factor for example is used as a criteria for judgement, the Dar es Salaam Paradigm shift in terms of a "Return to Master planning" would be classified as premature. It is in the sense that, the Dar es Salaam SUDP hadn't attained the minimum requirements to dominate theory and practice to the extent of creating an impact in 17 years of its existence. In that context, the impact of SUDP cannot be compared with that of Master Planning approach that has dominated planning theory and practice for over100 years in Tanzania. In this case, the conclusion arrived at by some writers and recently Namangaya (2013, p.1) on SUDP's Merits, and Suitability in guiding urban change is also premature and misleading. The conclusion: (i) is based on short term outcomes of SUDP, (ii) leaves out the core conceptual and theoretical tenets of SUDP which are central in determining and sustaining its long term outcomes.

V. Conclusion

The findings of this research have demonstrated that, the abandonment of the Dar es Salaam SUDP process and the resulting return to master planning was primarily a result of a misconception of the Theory of Paradigm shift. It has been revealed through this research that, the return to master planning approach was also spurred by persistence of the dominant planning approach. The dominant approach to urban planning has persisted in the sense that, the key SUDP stages involving introduction, plan formulation, content determination and interpretation into actions were done in the context of laws and procedures of the master planning approaches. In this regard, it is unfair and clearly misleading to assume that SUDP would have been effective in guiding urban change while it was being practiced within the context of same failed laws and procedures of the master planning approach.

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References Références Referencias

1. Albrechts, L (2001), "In pursuit of new Approaches to Strategic Spatial Planning", A European Perspective, International Planning Studies, 6(3)293-310.
2. Bryson, J .M., and Roering, W. D (1988), "Initiation of Strategic Planning by Governments", *Public Administration Review* 48 ( ) 995-1004.
3. Friedmann, J (1993), "Toward a Non-Euclidian Mode of Planning", *Journal of the American Planning Association,* 59(4): 482–5.
4. Friedmann, J (2003), "Why do Planning Theory"?, *Planning Theory,* 2(1) 7-10.
5. Giddings, B., and Hopwood, B (2006), "From Evangelistic Bureaucrat to Visionary Developer: The Changing Character of the Master Plan in Britain", *Planning Practice and Research,* 21(3) 337-48.
6. Halla, F (1997), Institutional Arrangements for Urban Management: The Sustainable Dar es Salaam Project, Dar es Salaam.
7. Halla, F (2002), "Preparation and Implementation of a General Planning Scheme in Tanzania: Kahama Strategic Urban Development Planning Framework", Habitat International 26() 281-293.
8. Healey, P (2003), "Collaborative Planning in Perspectives", *Planning Theory* 2 (2) 101-123.
9. Healey, P (1997), Collaborative Planning: Shaping Places in Fragmented Societies, Macmillan Press Ltd, London.
10. Healey, P et al., (1997), Salet and Faludi 2000; Albrechts et al.,2001; and Balducci 2001. In Healey

(2004): "The Resurgence of Strategic Urban Development in a European context", International Journal of Urban and Regional Research 28 (1), 45-67.
11. Innes, J.E (1995), "Planning Theory's Emerging Paradigm: Communicative Action and Interactive Practice" *Journal of Planning Education and Research,* 14(4), 183-189.
12. Kasala, S E, (2013), Operationalizing Strategic Urban Development Planning: A case of Dar es Salaam City, Tanzania, an unpublished Ph. D Thesis, University of Dar es Salaam.
13. Kasala, S E, (2014), Analysis of Outputs of a Planning Process: Sinza Strategic Urban Development Planning (SUDP) in Dar es Salaam, Tanzania. Global Journal of Human-Social Science: B Geography, Geo-Sciences, Environmental Disaster Management. Volume 14 Issue 7 Version 1.0
14. Kombe, W., and Kreibich (eds) (1997), Decentralised Development and Prospects of Planning in Africa, Spring Research Series, Dortmund Germany.
15. Kironde, J (1994), *The Evolution of the Landuse Structure of Dar es Salaam, 1890-1990,* Doctoral Thesis, University of Nairobi.
16. Majani, B (2000), Institutionalizing Environmental Planning and Management: The Institutional Economics of Solid Waste Management in Tanzania, Spring Research Series No. 28, Dortmund.
17. McConnell, S (1981), Theories for Planning, William Heinemann Ltd.
18. Mastop, H (1998), *National Planning: New Institutions for Integration,* paper for the XII AESOP Congress, Aveiro. Nijmegen School of Management, University of Nijmegen.
19. Namangaya, A (2013), A comperative Assessment of the Merits of Master Plans versus Strategic Urban Development Plans in Guiding Land Use Development. Journal of Building and Land Development (Special Issue), 21-37
20. Samson, E.K (2004), *Consolidating Environmental Planning and Management Practices: The Case of Solid Waste Management that Benefits the Poor in Dar es Salaam,* An unpublished Masters Thesis.
21. Salet, W and A. Faludi (Eds) (2000), *The Revival of Strategic Spatial Planning,* Koninklijke Nedelandse Akademie van Wetenschappen, Amsterdam.
22. Steinberg, F (2005), "Strategic Urban Planning in Latin America: Experience of building and Managing the future", Habitat International, 29(), 69-93.
23. Taylor, N (1998), *Urban Planning Theory Since 1945,* Sage Publications Inc, London.
24. Todes, A (2009), *Reframing Planning: New Agendas, Shifting Perspectives.* Paper Presented at an Inaugural Lecture. School of Architecture and Planning, University of the Witwatersrand, South Africa.
25. Tugwell, R (1974), "The Fourth Power Salvador Padilla. (ed.). Tugwell's Thoughts in Planning", Puerto Rico: University of *Puerto Rico Press.* 149-186.
26. UNCHS (1993), "The Management of Human Settlements: The Municipal Level", *United Nations Centre for Human Settlements. Nairobi*.
27. UNCHS (1994), "Sustainable Cities: Concepts and Applications of a United Nations Programme", United *Nations Centre for Human Settlements, Nairobi.*
28. *UN-Habitat (2004), "The Sustainable Cities Programme in Tanzania 1992-2003": The SCP, Documentation Series, Volume 3.*
29. UN-Habitat (2009), "Sustainable Urbanisation: Revisiting the role of Urban Planning", Global Report on Human Settlements. Nairobi, UN-Habitat.
30. URT (2007), The Urban Planning Act No. 8 of 2007, Dar es Salaam, Tanzania.
31. Watson, V and Gonzalez (2005), "Sociological Insitutionalist Approach to the Study of Innovation in Governance", Urban Studies 42(11) 2055-2069.
32. Watson, V (2002), Change and Continuity in Spatial Planning: Metropolitan Planning in Cap Town under Political Transition, London Routledge.
33. Watson, V (2009), "The Planned City Sweeps the Poor Away: Urban Planning and the 21st Century Urbanization", Progress in Planning 72() 151-193.

[i]Named after the advisor for the plan's preparation: the Local Government Engineer Mr. H. Leadbeater,

[ii]Including: the European residential areas in Kurasini and Oysterbay; Commercial neighbourhood centres in Oysterbay; the African zones in Kinondoni and Mwananyamala, and the industrial area along pugu, to mention but a few,

[iii]It could not justify its proposals for an outright removal of emergent squatter areas and all developments inconsistent with the master plan, and non-payment of compensation to those affected (Kironde 1994, p.355),

[iv]For instance, it underestimated the rate of the city's future growth (refer Figure 4 and Table 6), did not anticipate the government's policy inability to control city expansion, its proposals stressed rural and ignored urban development (Halla 1997 p. 23),

[v]This included the decentralization of economic activities from Dar es Salaam to other urban centres, and the shifting of the Country's capital to Dodoma,

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Computing Flood Volume of Dikpe Catchment using HEC-HMS

By Yaw Danquah Twumasi, Rev. John Ayer & Edward Mathew Osei Jnr.
Wa Polytechnic, Ghana

Abstract- Understanding the basic relationships between rainfall and runoff is vital for effective management of flood water. The Lawra District of the Upper West Region, the driest region in Ghana, has experienced periodic and devastating flash floods resulting from high intensity short duration rainfall, a characteristic of semi-arid and arid regions. However all these go waste leading to lack of water during the long dry season. Many methodologies have been applied such as using Digital Elevation Model (DEM) for hydrological modelling and watershed delineation. In this work delineated catchment area computed is used in HEC-HMS for flood volume computation. Annual rainfall for 2009 (a flood year) of 1178.38mm (46.393in) gives a runoff of 1.134m (44.652in) and a volume of 36,065,515.893m3. However a volume of 31,313,221.5m3 was obtained for August, September and October (months with heaviest rainfall) alone. Lumped Hydrological modelling with remote sensing data and GIS techniques for flood volume computation is possible using temperature, rainfall and flow rates values.

Keywords: flood; watershed; rainfall; runoff; HEC-HMS; hydrological modeling.

GJHSS-B Classification : FOR Code: 059999

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Yaw Danquah Twumasi [α], Rev. John Ayer [σ] & Edward Mathew Osei Jnr. [ρ]

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I. Introduction

Flood modelling, prediction and its associated empirical results in a computational environment such as GIS compactible software give various avenue (ideas) in the design of Early Warning Systems for flood prediction and disaster management. The key challenge in developing a reliable Early Warning System for disaster mitigation is the development of modelling and simulation tools to accurately make flood predictions, simulate river channel breaching and flood propagation [6]. The 2007 flood has been the worst flood ever in history [20], where 56 people were killed and 332600 affected in Ghana alone according to [15].

The catchment is unluckily located in the driest region in Ghana with a very long dry season. The natives there fore farm quite close to the Black Volta. However during the rainy season, thunderstorm activities produce flash floods [10], inundating the farmlands and homes. It is important to harness the flood water for agriculture, industry, trade, etc., thereby reducing or preventing flood damages whilst benefiting from it as well. The study therefore uses HEC-HMS to compute the volume of water the catchment receives (and may hold) during such events for an analysis on the support for domestic and industrial (mainly agriculture) water demands of the region.

II. Study Area

The Upper West region covers a geographical area of approximately 18,626.6 km^2. This constitutes about 7.81% of the total land area of Ghana. It falls within the Black Volta Basin, the largest of the catchments in the Volta Basin with a total area of 142,056km^2 of which 33,302km^2 (23.5%) is located in Ghana, [11]. The guinea savannah vegetation of the region provides heterogeneous collection of trees for domestic requirements such as fuel wood and charcoal, construction of houses, cattle kraals and fencing of gardens. With dry and wet seasons, it is characterized by the cold and hazy harmattan weather from early November to latter part of March when the dry season begins and ends only with the onset of the early rainfall in April. The temperature of the region is between a low of 15^{0}C at night time during the harmattan season and a high of 40^{0}C in the day during the hot period of the harmattan. The area includes northern parts of Ghana, southern Burkina Faso and northern Cote D'Ivoire [3]. Figure 1 shows fairly the study area.

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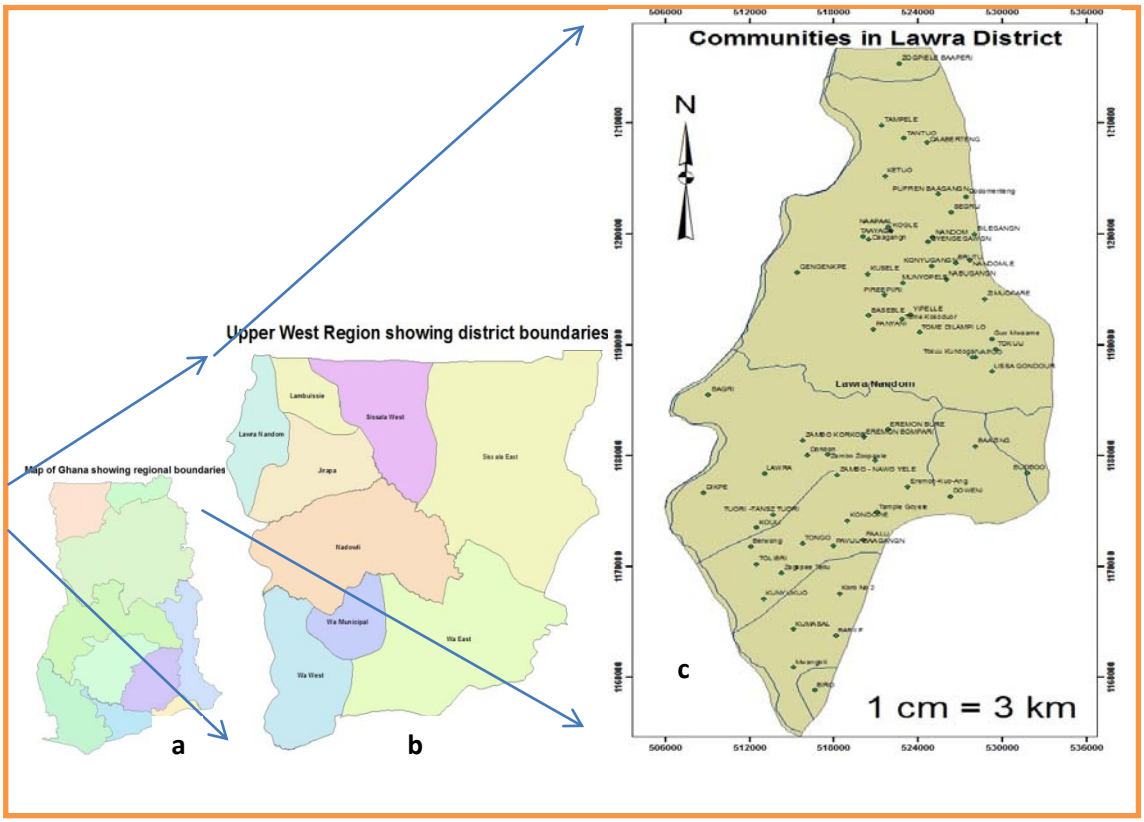

Figure 1 : Shows: a-map of Ghana, b-map of upper west region and districts, c-map of Lawra District and its communities and the Black Volta

III. Methodology

a) Data Sources and Selection Criteria and Processing

Rainfall values from 1980-2011 were obtained for Wa, Babile, Tumu and Lawra as these are the four weather stations in the region. It was important for a regional distribution because precipitation formation is quiet localized. The Wa meteorological station is a synoptic weather station and suffices for the whole of upper west region thus it gives a good representation of temperature for the entire study area. Flow rates and discharges were also obtained for the same period from the hydrological services department. Experiments were performed to verify the discharge data since these data needed to be highly reliable as the hydrological modelling process depended on their accuracy. Equations 1 to 3, an adoption from [9], were used to verify the discharge values having performed morphology determination exercise severally, the averages were used in the equations. A good result was obtained indicating the degree of reliability of the data.

$$\frac{Distance\ \ Travelled}{Average\ \ Time} = Average\ Stream\ Velocity\ (m/sec) \quad (1)$$

$$Total\ River\ Cross-section\ area\ (m^2) \times Average\ river\ velocity\ (m/sec) = Total\ river\ Discharge \quad (2)$$

$$Total\ River\ Discharge\ (m^3/sec) Correction factor\ (0.8\ or\ 0.9)\ Corrected\ total\ river\ discharge\ (m^3/sec) \quad (3)$$

b) Computing Runoffs and Volumes

The HEC-HMS will give the runoffs at different height if a good model is constructed. Multiplying this with the area of inundation will give the volume of inundation. The area of inundation is obtained from delineating the watershed at the Dikpe *outpour (pour point).* The DEM generated is used as the base layer [4], in the Arc Hydro environment [7], and a delineation process conducted. The procedure is shown in Figure 2.

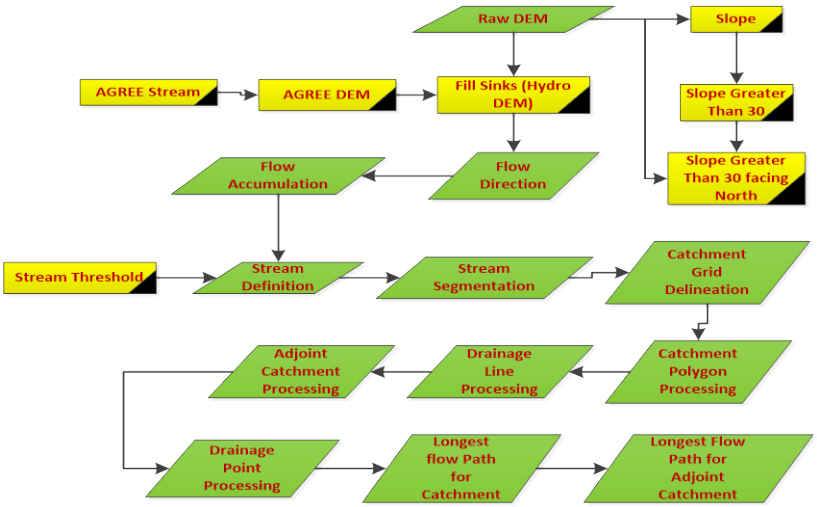

Figure 2 : Flowchart of Terrain Processes

i. *Modelling the Runoff Processes*

Hydrological models are based on a set of interrelated equations that convert the physical laws, which govern extremely complex natural phenomena, to abstract mathematical forms, [1]. Different varieties of models can be used, depending upon the conceived output, the existing database, input variables and required analysis [5]. [12], suggests the rainfall-runoff models can be classified according to their degree of representation of the physical processes and to the spatial and temporal description [8], although hydrologic models are approximations of reality, so the output of the actual system can never be forecasted with certainty. Likewise, hydrologic phenomena vary in all three space dimensions, and in time, but the simultaneous consideration of all five sources of variation (randomness, three space dimensions, and time) has been accomplished for only a few idealized cases [17]. Hydrological model as shown in Figure 3 emphasizes some aspects which are considered relevant instead of considering them as of secondary importance, and should be sufficiently comprehensible and easy to be used and sufficient to represent the physical studied problem [16].

The understanding of the dynamics of the rainfall runoff process constitutes one of the most important and challenging problems in hydrology. The main reason for modelling hydrological processes is the limitation of hydrological measurements [2]. At a local scale the processes are lumped up and depending on conditions prevailing (along the Black Volta in the Lawra district), the physical processes is better represented as in Figure 3.

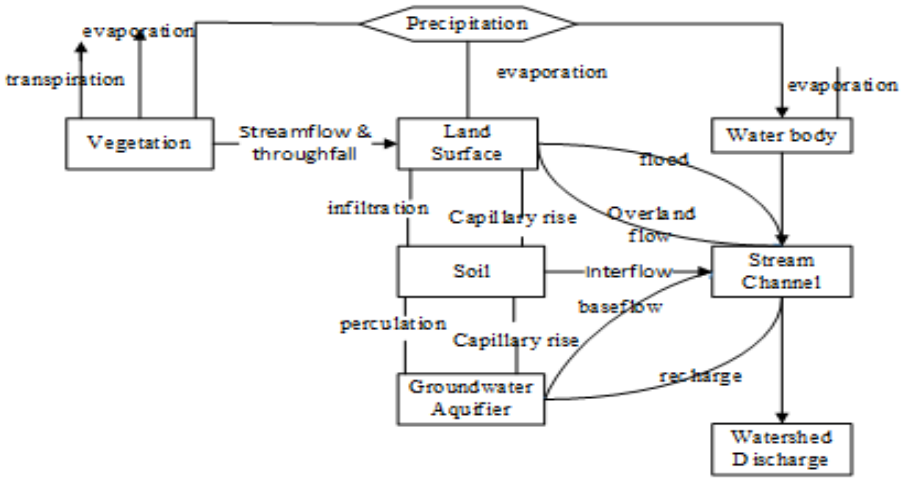

Figure 3 : Systems diagram of the runoff process at local scale (after [18]).

ii. *Modelling in the HMS Environment*

In this environment a basin model is created, by describing the watershed, to convert atmospheric conditions into stream-flow at specific locations in the watershed. Flow ratios were chosen to increase or decrease the computed flow by a fixed ratio and applied

only to sub-basin and source elements once the flow ratios are turned on. Each sub-basin and source can have a separate ratio, or no ratio. An alternative is to use Missing inflow where data for an element can be set to zero. Climate is one indicator of the probability of the types of runoffs that will occur in a given watershed. However, in arid regions the flow on smaller watersheds is nearly always surface runoff. Surface runoff or overland flow occurs when the rainfall rate is greater than the infiltration rate.

The model is designed by placing onto the user interface, hydrologic elements. Hydrologic elements are the basic building blocks of a basin model. An element represents a physical process such as a watershed catchment, stream reach, or confluence. Each element represents part of the total response of the watershed to atmospheric forcing. The various elements are connected to describe the physical watershed. Each link in the network is a one-way connector that takes outflow from an element and connects it as inflow to a downstream element. Figure 4 shows the modelled basin with hydrologic elements in HEC-HMS.

Next is a runoff-volume model where the Kinetic Wave is chosen because it fits the natural behaviour of river flows. The Soil Conservation Service (SCS) Curve Number (CN) models estimates precipitation excess as a function of cumulative precipitation, soil cover, land-use, and antecedent moisture, using the following equation, [13]:

$$P_e = \frac{(P - I_a)^2}{P - I_a + S}$$

Where P_e = accumulated precipitation excess at time t; P = accumulated rainfall depth at time t; I_a = the initial abstraction (initial loss); and S = potential maximum retention, a measure of the ability of a watershed to abstract and retain storm precipitation.

Figure 4 : HEC-HMS Basin Model of Hydrologic Elements

Until the accumulated rainfall exceeds the initial abstraction, and the precipitation excess, the runoff will be zero. From analysis of results from many small experimental watersheds, the SCS has developed an empirical relationship of I_a and S:

$I_a = 0.2S$, thus substituting gives;

$$P_e = \frac{(P - 0.2S)^2}{P + 0.8S}$$

Incremental excess for a time interval is computed as the difference between the accumulated excess at the end of and beginning of the period. The maximum retention, S, and watershed characteristics are related through an intermediate parameter, the curve number (commonly abbreviated CN) as:

$$S = \left\{ \frac{1000 - 10CN}{CN} \right\} \frac{25400 - 254CN}{CN}$$

The bottom equation is evaluated in SI units. CN values range from 100 (for water bodies) to approximately 30 for permeable soils with high infiltration rates. The channel routing model uses the momentum equation and the continuity equation known as St. Venant equations and accounts for forces that act on a body of water in an open channel, taking into account the shape of the channel, [14].

The models are based on data from 1980-2010 with 2011 data serving as a test year for the models. Annual rainfall that are suspected to have caused flood

during the flood years resulted in flow rates above 1000m^3/s. In the same vein annual rainfall recorded in these years are above 1000mm, recorded within the rainy season of March to November with very high probability of occurrence. Values from the remaining three months sum up to an insignificant factor to the annual total and therefore can confidently be ignored or included in the analysis. They were included though and the raw annual rainfall totals have been used as the amount that could cause flood.

IV. Results and Discussion

Dikpe is mainly savannah with alluvium soils. These give a curve number of 87 which correspond to S value of 1.49 according to the curve number in the National Engineering Handbook, part 630. For year 2009 the annual value P is 1178.38mm from Table 1. These values put into

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}\ in,$$

in inches results in a runoff of **44.652in**, and for 2007, **41.145in**. The channel capacity of the Black Volta is 21,085,440m^3 up to the Dikpe outlet, which means it can hold water to that capacity. Table 1 gives water volumes, obtained by multiplying runoff height by area of 31,798,197.75m^2 (3.18km^2), above which signifies the excesses that caused flood. These values are greater in 1995, 1999, 2005 and 2009 implying that the flood events in these years were much severe. All these years have rainfall intensities above 1100mm, indicating that rainfall above 1000mm and runoff above 38inches will cause flood in the Dikpe community. The model provides the runoff volumes in column 4 of Table 1 in inches.

Table 1 : Direct Runoff (Q) Estimation from annual rainfall in inches

Year	Rainfall P(mm) Ann. ave.	P (in)	$Q = \frac{(P-0.2S)^2}{P+0.8S}$(IN)		Volume (m^3) = Q x A		Ref. Year 2009	HEC HMS
			in	m				MM/m^3
1986	**1019.33**	40.131	**38.397**	**0.9753**	31,012,782.27		AUG	**1,549,596.72**
1995	**1260.63**	49.631	**47.887**	**1.2163**	**38,676,147.92**			**10,316,440.2**
1999	**1171.65**	46.128	**44.387**	**1.1274**	**35,849,288.14**		SEP	**1,632,207.89**
2002	**1082.64**	42.624	**40.887**	**1.0385**	33,022,428.36			**10,866,424.1**
2005	**1170.73**	46.092	**44.351**	**1.1265**	**35,820,669.77**		OCT	**1,521,645.84**
2007	**1089.23**	42.883	**41.145**	**1.0451**	**33,232,296.47**			**10,130,357.2**
2008	**1051.63**	41.403	**39.667**	**1.0075**	32,036,684.23		TOTAL	**4,703,450.45**
2009	**1178.38**	46.393	**44.652**	**1.1342**	**36,065,515.89**			**31,313,221.5**

This is an indication that runoffs over land will have heights above 38.897in for ordinary flood and above 47.654in for worse flood events according to history if we expect similar events or worse. From Table 4, with 2009 as the reference year, the volume of flood water is 31,313,221.5m^3 for the months August to October as opposed to 36,065,515.89m^3 for the entire year. This forms 86% of the total for the year which gives a degree of rainfall intensity and frequency within the three month period of the year. Forecasted annual rainfall values for 2012 ranges from 1011.8mm-1247.8mm using percentage growth method and moving average method respectively. A 13.2% percentage change has a return period of between 6.97 - 8.9 years, thus in every 7-8 years there will be a repeat of conditions of referenced year. Thus in 2016 or/ and 2017, there is going to be a repeat of the 2009 flood event or worse. Figure 5 shows the flooded area within the Dikpe catchment when there is a runoff height of 1.134m or 44.652in.

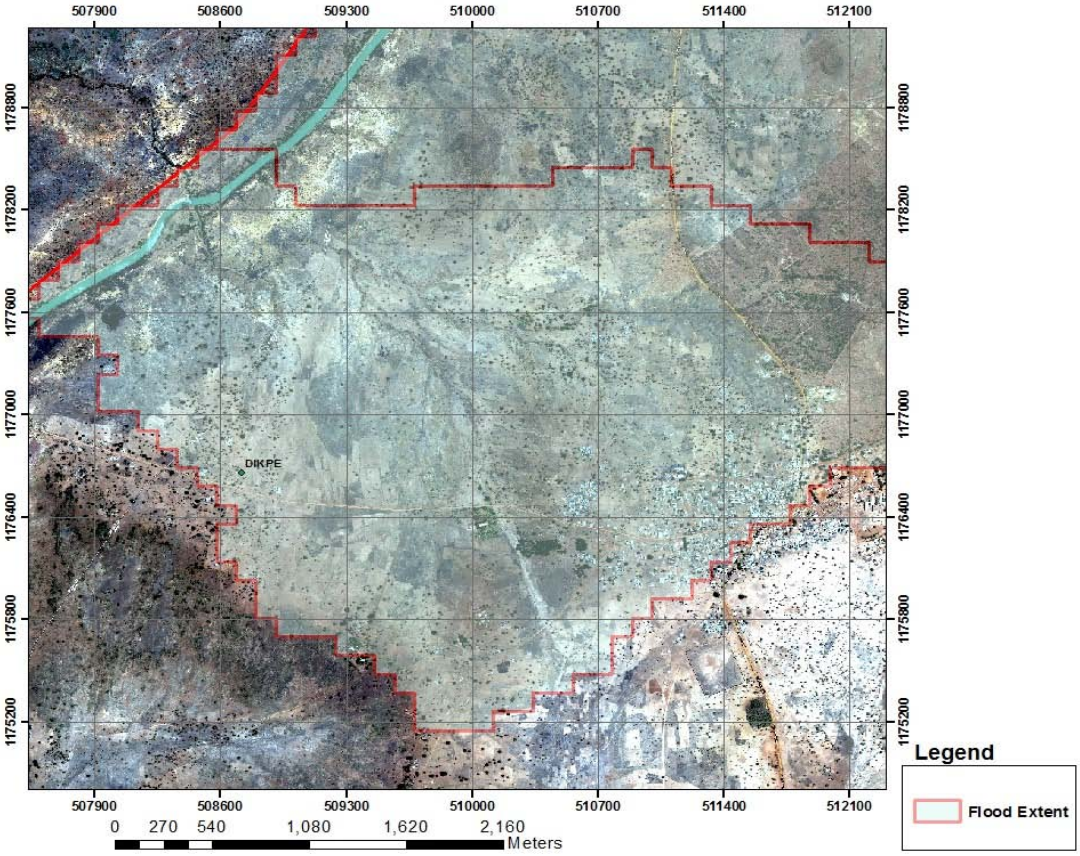

Figure 5 : Flood area with a runoff height of 1.134m

V. Conclusion

The model provides the runoff volumes in column 4 of Table 1 in inches. This is an indication that runoffs over land will have heights above 38.897in for ordinary flood and above 47.654in for worse flood events (according to history) if we expect similar events. Forecasted annual rainfall values for 2012 ranges from 1011.8mm - 1247.8mm using percentage growth method and moving average method respectively. Rainfall amount likely to cause flood (from the model) are annual average intensities above 1000mm. According to the model the Black Volta River catchment receives above 31,012,782.27m^3 of water during flood events and this could be harnessed to meet the water demand of the district.

VI. Acknowledgements

Thanks to Tibla Sandow of Meteorological Department in the Upper West region for helping in obtaining rainfall and temperature values for four weather stations in the region for the study period. We also express gratitude to Ebenezer Allotey of the Hydrological Services Department, Accra in assisting us to obtain flow rates and discharges for the study.

Conflict of Interest

The authors declare no conflict of interest.

References Références Referencias

1. Barbara Lastoria, 2008. Hydrological processes on the land surface: A survey of modelling approaches. FORALPS Technical Report, 9. Universitàdegli Studi di Trento, Dipartimento di Ingegneria Civile e Ambientale, Trento, Italy, 56 pp.
2. Beven, K.J., 2001. Rainfall-runoff modelling - The Primer. John Wiley & Sons, Chichester, 360 pp.
3. Boubacar Barry, Emmanuel Obuobie, Marc Andreini, Winston Andah, Mathilde Pluquet, 2005. The Volta River Basin: *Comprehensive Assessment of Water Management in Agriculture.* Comparative study of river basin development and management. pp 1.
4. Forkuo, E. K., 2010. Flood Hazard Mapping using Aster Image data with GIS. International journal of Geomatics and Geosciences, Volume 1, No 4, 2011. ISSN 0976 – 4380
5. Keith Smith, and Roy Ward, 1998. Floods-Physical Processes and Human Impact, pp 3-4, John Wiley & Sons Ltd , Baffins Lane, Chichester, West Sussex PO19 IUD, England
6. M. Ekhwan Toriman, A. Jalil Hassan, M. Barzani Gazim, Mazlin Mokhtar, S.A. Sharifah Mastura, Osman Jaafar, Osman Karim and Nor Azlina Abdul Aziz. Integration of 1-d Hydrodynamic Model and GIS Approach in Flood Management Study in

Malaysia. Research Journal of Earth Sciences 1(1): 22-27, 2009.
7. Maune, D.F., 2001. Digital elevation model technologies and applications: the DEM user's manual The American Society for Photogrammetry and Remote Sensing (ASPRS), Bethesda.
8. Melone F., Barbetta S., Diomede T., Peruccacci S., Rossi M., Tessarolo A., 2005. Review and selection of hydrological models – Integration of hydrological models and meteorological inputs. RISK AWARE - INTEREG IIIB CADSES programme.
9. Nancy M. Trautmann and the Environmental Inquiry Leadership Team: Watershed Dynamics, Student Edition. National Science Teachers Association Press, Arlington, Virginia, 2004.
10. Nick van de Giesen, Jens Liebe and Gerlinde Jung, 2010. Adapting to climate change in the Volta Basin, West Africa. Special section: Climate change and water resources, current science, vol. 98, no. 8, 25 April, 2010.
11. Opoku-Ankomah Y., 1998. Volta Basin System Surface Water Resources in Water Resources Management Study. Information Building Block. Part II, Vol. 2. Ministry of Works and Housing. Accra, Ghana.
12. Singh V.P., 1995. Computer Models of Watershed Hydrology. Water Resources Publications, Highlands Ranch, Colorado.
13. Soil Conservation Service, 1986. Urban hydrology for small watersheds, Technical Release 55. USDA, Springfield, VA.
14. Todini, E., 1988. Rainfall-runoff modelling - Past, present and future. Journal of Hydrology, 100(1-3): 341-352.
15. USAID Disaster Assistance: Ghana-Disaster at a Glance.Floods11022011,http://transition.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/countries/ghana/template/index.html. Accessedon27/02/2011
16. Vieux, B.E., Cui, Z. and Gaur, A., 2004. Evaluation of a physics-based distributed hydrologic model for flood forecasting. Journal of Hydrology, 298(1-4): 155-177.
17. Wagener, T. and Wheater, H.S., 2004. Rainfall-runoff Modelling in gauged and ungauged catchments. Imperial College Press, London, 306 pp.
18. Ward R.C., 1975. Principles of hydrology. McGraw-Hill Book Company (UK) Limited, London.
19. Wikipedia, 2007b. Floods Retrieved November 2, 2007, 2007, from http://en.wikipedia.org/ Accessed on 13/03/2011.
20. Zhang, W., & Montgomery, D. R. (1994). Digital elevation model grid size, landscape representation, and hydrologic simulations. Water Resources Research, 30(4), 1019-1028.

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Petrography, $\delta^{18}O$, $\delta^{13}C$ in Campanian Region (Southern Italy) Speleothems

By Angelo Paone
Università degli Studi di Napol, Italy

Abstract- Spelethems are good proxy to understand the environmental condition above the cave where they form. I have studied three speleothems from the Campanian region (Matese Mts, Sorrentina peninsula and Cilento area). The splethems should suggest the climatic condition some time in the past in Campanian region. I present data on the petrography, SEM, and Carbon and Oxygen isotopes. The data present a scenario sapropelic some time in the past in Campanin region.

Keywords: *speleothem, campania, sapropel, isotopes, petrography.*

GJHSS-B Classification : *FOR Code: 040699p*

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Keywords: speleothem, campania, sapropel, isotopes, petrography.

I. Introduction

Speleothem studies (trace elements (Sr, Mg and P), O and C isotopes, and U/Th disequilibria series) are a good proxy to understand the climate variability during their growth. The relationship between the time growth (U-Th dating), laminae extention rate of the stalagmite and/or stalactite, petrographic and textural studies (S.E.M.), and isotopes ($\delta^{18}O$, $\delta^{13}C$) variations are the useful tools to determine the climate variation during the last 10.000 yr. BP (e.g., McDermott et al., 1999; Huang et al., 2001). McDermott et al. (1999) illustrates the climate variability in Europe from three spleotherms from (Ireland, Southern France and North Italy) during the Holocene (10,000 up to now). They conclude that during the Holocene there has been significant decoupling between the Atlantic (Ireland site) and Mediterranean seaboard (France site). They also affirm that there has been little climate variation between the southern Alpine (North Italy) and the Mediterranean seaboard (France site). However, for a better understanding of the climate variability during the past 10,000 yr. BP, much more studies has to be accomplished, increasing the number of speleotherms studies around Europe. In this direction some studies have focused their energy to samples younger than 10.000 yr. Bard et al. (2002) demostrated that $\delta^{18}O$ in a stalagmite from 19 metres below present-day sea-level at Argentola Cave on the Tyrrhenian coast of Italy exhibits a 2-3 ‰ shift to lower values between 180 and 170 ka (MIS sub-stage 6.5). Approximately 0.8 – 1.5 ‰ of the observed 2-3 %0 shift in $\delta^{18}O$ can be accounted for by changes in the isotopic composition of the vapour source, but the remaining 1-2 ‰ was interpred as conditions in the region during MIS 6.5. The inferred change to wetter conditions during sapropel 6 is consistent with the pluvial events during this and later sapropel events (S1-S6) inferred independently on the basis of decreases in $\delta^{18}O$ in speleothems from Israel (Bar-Matthews et al., 2000; Ayalan et al., 2002).

A remarkably coherent picture of continental climate Late Pleistocene variability with close links to the oceanic realm has emerged from studies of speleothems from the eastern margin of the Meditteranean. Partucularly inpressive is the well-dated composite $\delta^{18}O$ record for the past 185 Kyr based on 21 speletherms from Soreq cave in Israel (Bar Matthews et al., 1996; 1997; 1999; 2000; Kaufman et al., 1998; Ayalan et al., 1998; 2002). One of the reasons that robust matches can be made between different coeval speleotherms in this composite record is that the shifts in $\delta^{18}O$ are relatively large (several per mil), indicating a relatively strong climatic signal in the $\delta^{18}O$ record. The Soreq record appears to reflect predominatly two effects (i) changes in the $\delta^{18}O$ of the oceanic vapour source, and (ii) the "amount effect" (Bar Matthews et al., 1996; 1997; 1999; 2000; Kaufman et al., 1998; Ayalan et al., 1998; 2002). These studies are important because they establish a critical link between the oceanic realm and continental climate in the Meditteranean region. Thus, $\delta^{18}O$ minima in speleotherms from Soreq coincide exactly with the occurence of sapropel events in the Meditteranean sea, and recently it has been shown that this is true for glacial as well as for interglacial condition (Ayalan et al., 2002). The dominance of the "amount effect" on $\delta^{18}O$ in stalagmites in this region allows reliable recostraction of arid and pluvial phases. However, It appears that, from this point of view and following this approach, there is not such a studies covering the southern Italy area during the Holocene (10.000 yr up to now). Spleothems offer the best opportunity to accurately constain the timing of clearly defined climate signals (e.g., glacial-interglacial transitions, D/O oscillations, the "8.200 year" event). It is noteworthy that at present the low-latitudes southern Italy are under-represented in the currently dated speleothem stable isotope records.

To particularly implement the understanding of climate change in Southern Italy and to confront different climatic micro-area (McDermott et al., 1999), a spleotherm systematic study (textural studies, $\delta^{18}O$, $\delta^{13}C$

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isotopes variations) from the southern Appenine area (Campanian region, Southern Italy) is presented.

II. Samples Studied

The samples are from limostone cretaceous caves outcropping on the southern Appenine (Fig. 1). The speleothems samples are from "Campo Braca" cave on S. Gregorio del Matese city council zone (Mt. Matese; Caserta); the entrance complex cave coordinates are lat. 41° 25' 03" and long. 1° 52' 54" and is 1130 mt. asl. From the frist horizontal corridor which is around 30 mt, the sample was taken. From the "Inghiottitoio del Trarro" ("Buco del Trarro"; Marina di Camerota), with coordinates of lat. 40° 01' 04" and long. 2° 54' 25", respectively. The entrance is 220 mt asl. The corridor is semi-horizontal with length of 82 mt and depth 18 mt. These samples are found at north and south of the Appenine length chain. The speleothem size ranges from 40 cm with diameter of 15 cm (Campo Braca) to more than 80 cm with 20-30 cm in diameter ("Buco del Trarro), from "Santa Barbara" cave in Bomerano, Agerola, just at middle distance between the previous sampling sites another sample was collected. The Santa Barbara cave is several hundred meters deep the cave is formed in limestone and on entrance there are outcrops of trasgressive deposits fromed by mostly sands with partly flowstone covering the deposits.

III. Analytical Methods

Scanning electron microscope (SEM) observations on morphology and major element analyses were performed on a Jeol JSM-5310 instrument (CISAG, Università degli Studi di Napoli "Federico"), in the energy-dispersive spectroscopy (EDS) mode (Link Analytical 10000, ZAF corrections). Silicates, oxides and pure elements were used as standards, operating conditions were 15 kV acceleration voltage and 10 mm spot size. Identification of the entire mineral assemblage was made by combined SEM-EDS analyses, using the Jeol JSM-5310 instrument. Stable isotope analysis were made by Carbonate powders were reacted with 100% phosphoric acid (density >1.9, Wachter and Hayes, 1985) at 75°C using a Kiel III online carbonate preparation line connected to a Thermo Finnigan 252 mass pectrometer. All values are reported in per mil relative to V-PDB (Pee Dee Belemnite standard) by assigning a $\delta^{13}C$ value of +1.95‰ and a $\delta^{18}O$ value of -2.20‰ to NBS19. Reproducibility was checked by replicate analysis of laboratory standards and is better than ± 0.2 (1σ). Oxygen isotopic compositions of dolomite and siderite were corrected using the fractionation factors given by Rosenbaum & Sheppard (1986).

IV. Petrography and sem-eds Summary

These speleothems show varve-like submillimeter-scale color bands. The color of such speleothems is chiefly due to the presence of variable amounts of clay or humic substances which coprecipitated or absorbed onto calcite surfaces from drip waters that passed through soil before entering the cave. Lauritzen *et al.* (1986) found that humic and fulvic acids are readily soluble and may be expected to enter speleothem feed waters preferentially during growing seasons. The two groups found in speleothems may be taken as indices of productivity in the overlying soil and plant cover and, therefore, as a proxy measure of paleoclimate (Lauritzen *et al*. 1986). This cycle is probably a response to hydrological events in the recharge to the cave.

Petrography (Fig. 2) and X-ray diffraction (Fig. 3) indicate that the speleothems examined in this study are all calcite, but their fabrics vary from inclusion zoned to clear and featureless. Macroscopically, transverse sections of speleothem show mostly light brown calcite with pronounced fine-scale zonation. Microscopically, speleothem consists of elongate or columnar calcite crystals radiating from the speleothem's center.

Both kinds of inclusions define apparent zones that extend across calcite crystals and that can commonly be traced either perpendicular than parralel to the concentric circles growth all the way around the central canal. None of the edges of the columnar calcite crystals coincide with the growth zones defined by inclusions. Some patterns of inclusions in the outer areas have the form of euhedral calcite terminations, whereas others appear to follow growth zonations that, if continuous, would define large concentric circles around the central canal. The faster the growth rate, the warmer and/or wetter the climate is above the cave (Hennig 1983; Dreybrodt 1982).

Frist speleothem that we have obtained data on petrography, SEM and SEM-EDS is from Campo Braca.

The stalagmite seems to be completely formed by calcite crystal. The crystalline structure is between palisade calcite to columnar calcite. It is worth noting the straight parallel crystal boundaries between the long crystals. The calcite crystal have the c axes parallel to the cut of the thin section. This is true for all the samples examined. Detrital carbonate grains are also individuated and they can be evidence of a dry climate and can be used in paleoclimatology (Railsback et al., 1999). The cristalline concretization forms layers with different color bands. Although the color of the bands defining these layers is suggestive of iron oxide, SEM-EDS analyses reveals the presence of only Mg (not much) and Si, Fe and perhaps Al, suggesting the presence of a smectitic clay mineral. Layers in inclusion-rich calcite defined by variation in size and abundance of inclusions are also present. Presence of absence of

fluid inclusion in layers can give an estimate of the rate of precipitation of the calcite. Presence of fine red-brown layers in columnar calcite in a stalagmite during the last stages of crystallization which give rise to the accumulation of clay material. This is also shown from the SEM-EDS analyses.

SEM image show columnar calcite in the stalagmite. However, SEM image have also shown the presence of equant calcite in the same stalagmite. SEM-EDS analyses have been done systematically for each layer. Following are shown two analyses which are respectively of calcite crystal and from a clay rich material (Table 1).

V. Stable Isotope Discussion

The seepage water, upon entering a cave passage of lower CO_2 concentration (relative to the soil atmosphere), releases CO_2 and $CaCO_3$ deposition takes place (Holland et al., 1964). Because bicarbonate concentrations of karst ground waters are typically in the parts per thousand range, the d18O compositions of the water and the dissolved carbonate species are dominated by the water molecules themselves, which originated as meteoric precipitation. Therefore, the $d^{18}O$ values of speleothems are generally not significantly influenced by the bedrock isotopic composition (Harmon, 1979a). Speleothem $d^{13}C$ values, however, are significantly influenced by the isotopic composition of the bedrock, and the soil CO_2. The latter is strongly related to the vegetation overlying the cave, and vegetation at the regional scale is strongly correlated to climate.

Where the calcite is deposited in equilibrium with the thermodynamic environment, the $^{18}O/^{16}O$ ratio in a speleothem may vary with the temperature of the cave or with the isotopic composition of the rainfall (itself a temperature-dependent variable).

When speleothems are deposited in isotopic equilibrium with their parent drip waters, two factors cause variations in calcite δ18O:

1) Variations in cave temperature,
2) Variations in δ18O of seepage water and meteoric water respectively, which depend on: a. Changes in the δ18O of the oceanic source region (ice volume effect), b. Changes in moisture sources or storm tracks, c. Variations in the proportion of precipitation (e.g., winter/summer precipitation), d. Air temperature, e. Amount of precipitation (amount effect), f. Evaporation in the epikarst and/or within the cave.

Where calcite has formed in oxygen isotopic equilibrium with ambient water, the isotopic fractionation between calcite and water, dc-w, is dependent on the temperature (O'Neill *et al*. 1975):

$$1000 \ln dc\text{-}w = 2.78 * 10^6 T^2 (K^2) * 2.89$$

Where $dc\text{-}w = (1000 + \delta^{18}Oc) / (1000 + \delta^{18}Ow)$ and $\delta^{18}Oc$ and $\delta^{18}Ow$ are the $\delta^{18}O$ values of calcite and water, respectively and K is the equilibrium constant.

Dorale *et al*. (1998) calculated temperatures of deposition of speleothems from their $\delta^{18}O$ values using the following equation $\delta^{18}Oc = (0.695T + 986.4)\exp[2780/(273.15 + T)^2]^{-0.00289} - 1000$

where T is in °C.

For speleothems deposited under isotopic equilibrium conditions, oxygen isotopic variations reflect changes in the isotopic composition of meteoric water and can be linked to climate through understanding of the hydrologic cycle.

The $^{13}C/^{12}C$ ratio is believed to vary with the abundance of ^{13}C-depleted CO_2 in the soil in a similar manner. Both ratios may be distorted by kinetic processes, chiefly evaporation. I present data on Oxygen and carbon isotopes for all three speleothems (Fig. 4). In Campa Braca spleleothm, the Carbon and Oxygen isotopes are overlapping with the Soreq cave spelethems (Bar-Matthews et al., 1997) suggesting a sapropel event. However, the Oxygen isotopes tend through the Sapropel events for all three speleothems (Fig. 4). The $^{13}C/^{12}C$ suggest different vegetation between the three sites

VI. Conclusions

All the data presented suggest that in Campania in the past has occurred a sapropel event, with different climatic condition between North and South area. the future research is to point the time when these events have possibly been forming.

VII. Acknowledgement

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References Références Referencias

1. Ayalan A., Bar Mathews M., Sass E. (1998) Rainfall-recharge relationships within a karstic terrain in the Eastern Mediterranean semi-arid region, Israel: $\delta^{18}O$ and δD characteristics. J. Hydrology 207, 18-31
2. Ayalan A., Bar Mathews M., Kaufman A. (2002) Climatic conditions during marine oxygen isotope stage 6 in the eastern Mediterranean region from the isotopic composition of speleotherm of Soreq Cave, Israel. Geology 30, 303-306
3. Bar Matthews M., Ayalan A., Matthews A., Sass E., Halicz L. (1996) Carbon and oxygen isotope study of the active water-carbonate system in a arstic Mediterranean cave: implication for palaeoclimate

reserach in semiarid regions. Geoch. Cosmoch. Acta 60 (2), 337-347
4. Bard E., Delaygue G., Rostek F., Antonioli F., Silenzi S., Schrag D.P. (2002) Hydrological conditions over the western Mediterranean basin during teh deposition of the cold sapropel 6 (ca. 175 Kyr BP). Earth Planet. Sci. Lett. 202, 481-494
5. Bar Mathews M., Ayalan A., Kaufman A. (1997) Late Quaternary paleaeoclimate in the Eastern Meditteranean region from stable isotope analysis of speleotherms at Soreq cave, Israel. Quater. Res. 47, 155-168
6. Bar Mathews M., Ayalan A., Kaufman A., Wasserburg G.J. (1999) The Eastern Meditteranean palaeoclimate as reflection of regional events: Soreq cave, Israel. Earth Planet. Sci. Lett. 166, 85-95
7. Bar Mathews M., Ayalan A., Kaufman A. (2000) Timing and hydrogeological conditions of Sapropel events in the Eastern Meditteranean, as evident from speleotherms, Soreq cave, Israel. Chem. Geol. 169, 145-156
8. Dorale, J.A., Edwards, R.L., Ito, E., & Gonzalez, L.A., 1998, Climate and vegetation history of the midcontinent from 75 to 25 ka: A speleothem record from Crevice Cave, Missouri, USA: Science, v.282, p. 1871-1874.
9. Dreybrodt, W., 1982, A possible mechanism for growth of calcite speleothems without participation of biogenic carbon dioxide: Earth and Planetary Science Letters, v.58, p. 293-299.
10. Frisia S., Borsato A., Fairchild I.J., McDermott F. (2000) Calcite fabrica, growth mechanisms, and enviroments of formation in speleothems from the Italian Alps and southwestern Ireland. J. Sedimen. Res. 70, 1183-1196
11. Frisia S., Borsato A., Fairchild I.J., McDermott F., Selmo E.M. (2002) Aragonite-calcite relationships in speleotherms (Grotte de Calmouse, France): Environment, fabrics, and carbonate geochemistry. J. Sedimen. Res. 72, 687-699
12. Harmon, R.S. 1979. An isotopic study of groundwater seepage in the central Kentucky karst. *WaterResources Research* **15**, 476-480.
13. Hennig, G.J., Grun, R., & Brunnacker, K., 1983, Speleothems, travertines and paleoclimates: Quaternary Research, v.20, p. 1-29.
14. Holland, H.D., Kirsipu, T.V., Huebner, J.S., and Oxburgh, U. M. 1964. On some aspects of the chemical evolution of cave waters. *Journal of Geology* **72**, 36-67.
15. Huang Y., Fairchild I.J., Borsato A., Frisia S., Cassidy N.J., McDermott F., Hawkesworth C.J. (2001) Seasonal variations in Sr, Mg and P in modern speleothems (Grotta di Ernesto, Italy) Chem. Geol. 175, 429-448
16. Lauritzen, S.E., Ford, D.C. & Schwarcz, H.P. (1986) Humic substances in speleothem matrix – Paleoclimate significance. *International Congress of Speleology 9, Communications*. *2*: 77-79.
17. McDermott F., Frisia S., Huang Y., Longinelli A., Spiro B., Heaton T.H.E., Hawkesworth C.J., Borsato A., Keppers E., Fairchild I.J., van der Borg K., Verheyden S. and Selmo E. (1999) Holocene climate variability in Europe: Evidence from δ18O, textural and extension-rate variations in three speleotherms. Quatern. Sci. Rev. 18, 1021-1-38
18. O'Neil, J.R., Adami, L.H., & Epstein, S., 1975, Revised value for the ^{18}O fractionation factor between H_2O and CO_2 at 25°C: U.S.G.S. Journal of Research, v.3, p. 623-624.
19. Kaufman A., Wasserburg G.J., Porcelli D., Bar Matthews M., Ayalon A., Halicz L. (1998) U-Th isotope systematics from the Soreq cave, Israel and climate correlations. Earth Planet. Sci. Lett. 156, 141-155
20. Railsback, L. B., 1999, Patterns in the compositions, properties, and geochemistry of carbonate minerals: Carbonates and Evaporites, v. 14, p. 1-20.
21. Rosenbaum, J. & Sheppard, S.M. (1986): An isotopic study of siderites, dolomites and ankerites at high temperatures.- Geochim. Cosmochim. Acta, 50, 1147-1150.
22. Wachter, E. and Hayes, J.M. (1985): Exchange of oxygen isotopes in carbon-dioxide - phosphoric acid systems.- Chemical Geology, 52, 365-374.

Figure Captions and Table

Figure 1 : Sampled studied coming from the limostone cretaceous caves outcropping on the southern Appenine (Campanian region).

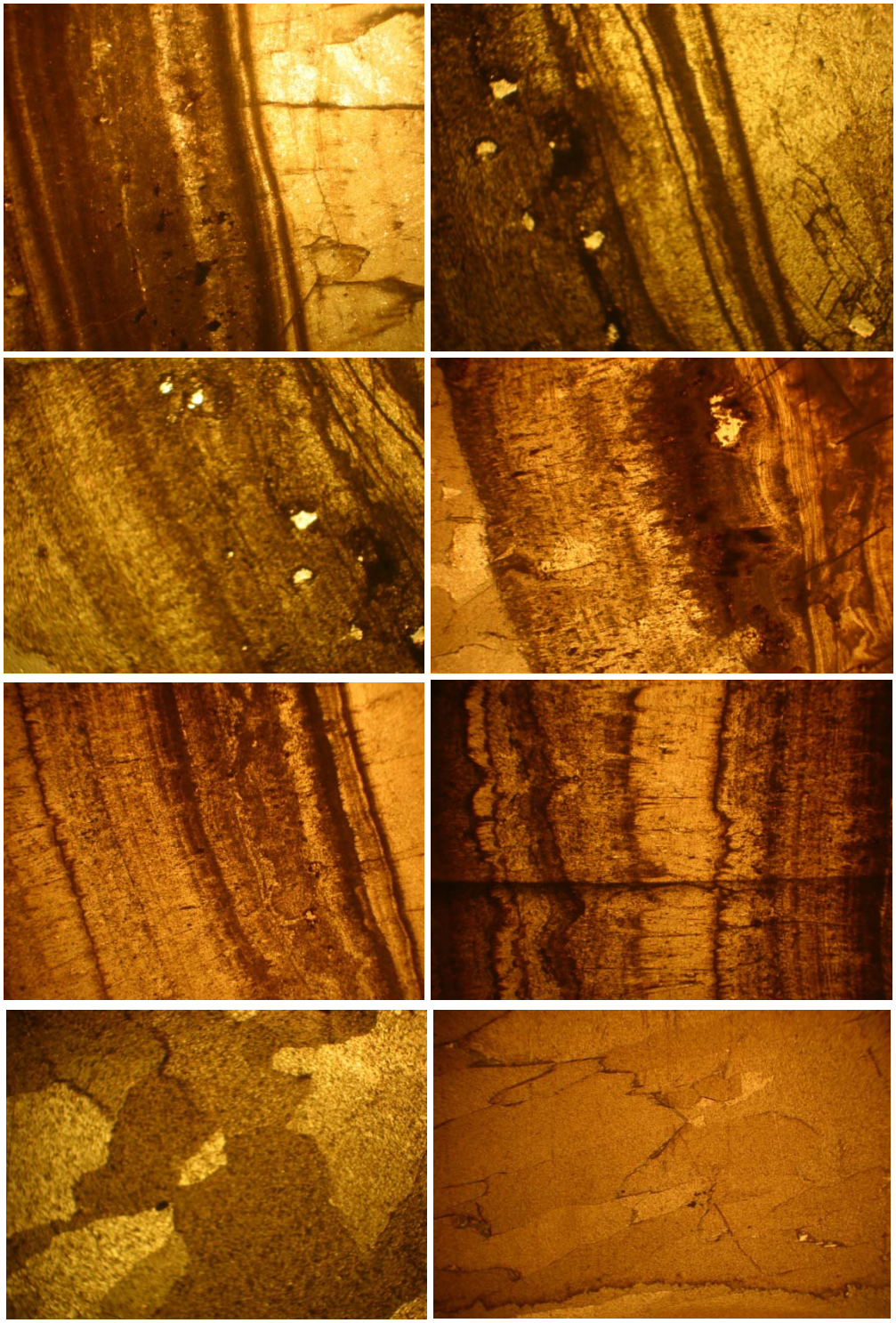

Figure 2 : Petrography of the Campo Bracca speleothem.

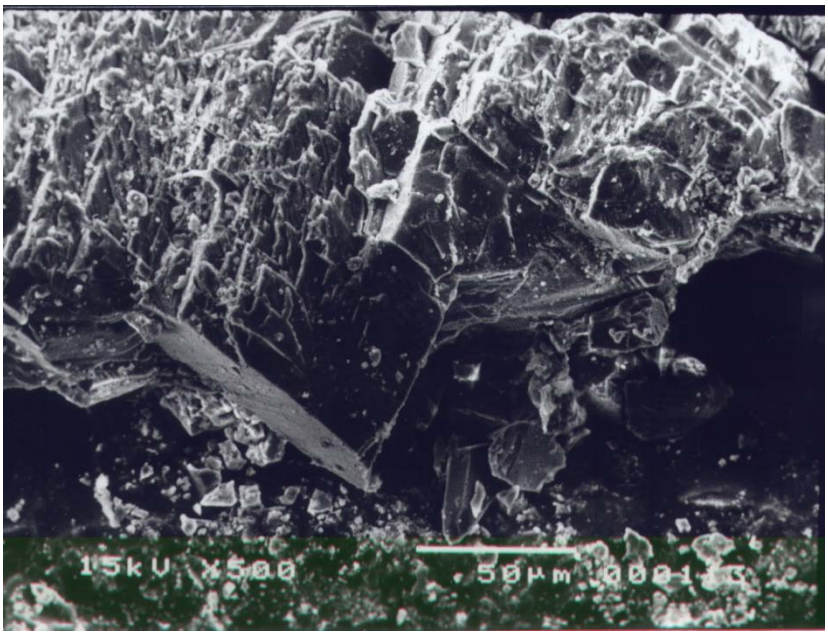

Figure 3 : Image SEM as an example of some speleothem, the SEM images are all approximately monotonous.

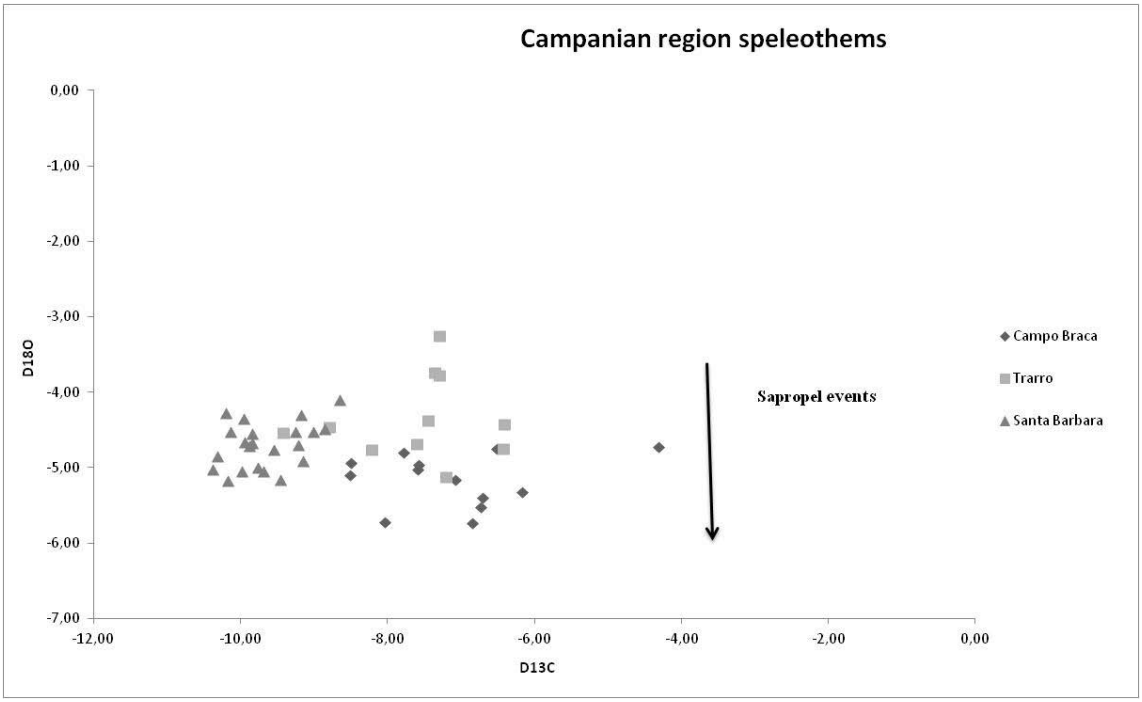

Figure 4 : Diagram of the $\delta^{18}O$ versus $\delta^{13}C$ of the all speleothems presented.

Table 1 : Major element Data obtained on the three speleothems

Samples	SiO2	Al2O3	MgO	FeO	ZnO	CaO	K2O	Na2O	MnO	TiO2	PbO	S	SrO	P2O5	tot
CB 5ANL10	1,171	0,233	0,423	4,541	0	48,216	0	0,447	0,019	0,065	0	0,384	0	0	55,499
CB 5A3	0,266	0,472	0,198	1,01	0	97,024	0	0,486	0,063	0,027	0	0,232	0,028	0,194	100
CB S2A4D	69,886	1,338	4,605	0,228	0,145	8,514	0,46	13,846	0,126	0,028	0,109	0,007	0,286	0,419	99,998

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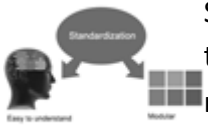

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After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

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Note :

"

- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

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1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

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- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

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	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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