



Past, Present and Future of Speleological Investigations in Morocco¹

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Abstract

Moroccan speleological potentialities are very important over some 100,000 km² of exposed limestones. A valuable speleological report published 20 years ago mention some hundreds of penetrable cavities known at the moment. A number of new caves have been discovered and visited during last years, and the known part of some galleries significantly increased. For example the Wit Tmadouine network (including the longest subterranean river from North Africa), some 65 km East North-East of Agadir in the Western High Atlas, is passed from 8,5 km as mentioned in the literature to 19 km to date and is still not completely known. Other similar examples do exist in the Middle Atlas. During the "13th International Symposium of Biospeleology" held in Marrakesh in 1997, a particular attention was devoted to the fauna of caves and subterranean rivers or groundwaters. A number of cavities known only by local populations are still unknown to speleologists and biospeleologists. International collaborations between speleologists of any country, either for fieldworks or for publication of results of former explorations will be welcome by Moroccan young speleologist teams.

Moroccan speleological potentialities are very important: within some 100 000 Km² of exposed limestone areas, less than thousand cavities only are presently recorded and thus much speleological investigations remain to be performed.

The "Inventaire Spéléologique du Maroc", drawn up by C. LAMOUREUX and C. CAMUS, published in 1981 by the "Direction de l'Hydraulique" (Ministry of Equipment, Rabat), and the Bulletin of Speleological clubs of Rabat, Casablanca and Agadir, published in 1987, are the sole available basic data providing references of known cavities from the country.

After the departure of most French cooperation agents, the Moroccan subterranean cavities were and are still the object of many explorations, performed by different teams, especially by Moroccan-European groups. Therefore each year several expeditions and speleological sessions are organized in Morocco, in different regions of the country, and new gallery networks are frequently discovered.

The aim of our presence and participation to the 13th International Congress of Speleology is double: to present a general image of the speleology in Morocco, emphasizing the last discoveries but also and mainly to get in touch as much as possible with speleologists having already visited caves in our country, and who had not the opportunity of publishing the reports and results of their explorations. As a matter of fact during many recent prospections in different Moroccan regions, it clearly appears that most unlisted cavities however exhibit traces or marks of former non Moroccan speleologists. Therefore an insufficiency of communication and spreading of speleological information appears important for the whole community of speleologists interested in caves from this country. A better spreading of speleological information, and the publication of main results are very desirable for avoiding long and unprofitable researches of caves which are already located and known by former explorers. Moreover it is also regrettable and unnecessary to perform the topographic mapping of a cave or of a complex subterranean network if this work was already achieved by other cavers, but simply unpublished and often totally unknown in Morocco.

The publication of a new edition of the "Inventaire spéléologique du Maroc", including complements, revision and improvement of the first edition is essential for placing at user's disposal a more complete and up to date compilation of speleological data. This tremendous work will be possible only at the price of a close collaboration between the young Moroccan speleologists and the interested groups from other countries.

¹ This paper is dedicated to the memory of our friend Hassan EL HACHTOUKI, who was an active caver. He contributed with one of us (M.M.) to the exploration of many new cavities in Morocco

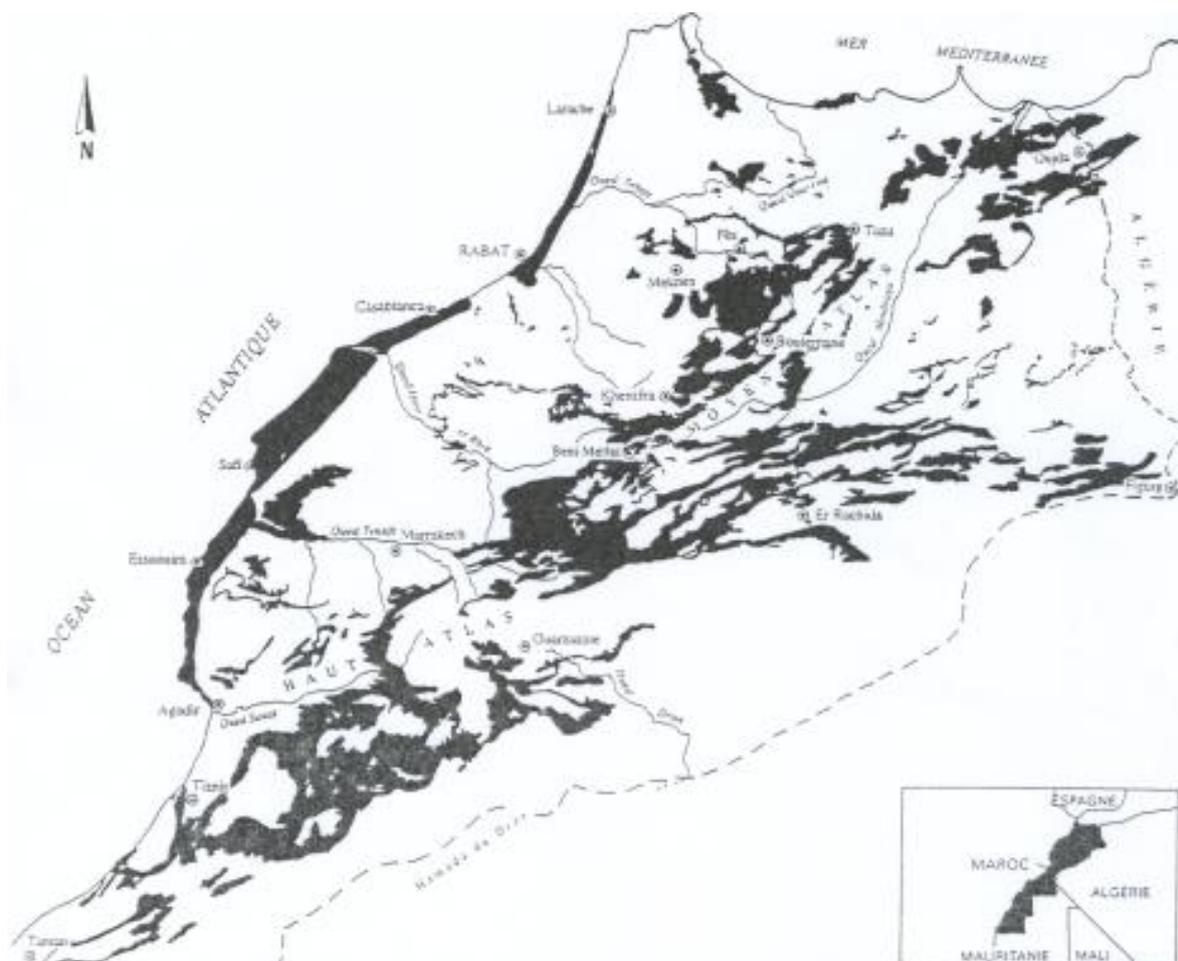


Figure 1 - Main regions of central and northern Morocco where limestones or calcareous sandstones, include or possibly include penetrable karstic cavities (from Boutin et al., 2001).

During last years the total development of several subterranean networks has been greatly enlarged after new explorations. The known part of the Win Tmadouine network for example (the longest subterranean river of North Africa located some 65 Km to the East North-East of Agadir) passes from 8,500 m as indicated in the literature to more than 19,000 m to date, and the works for freeing the galleries of obstructions are still going on. Chaara, the second subterranean river in Morocco, has been also the object of important discoveries and its development recently passes from 7,650 m to more than 10,000 m. Conversely several pits mentioned in the inventory were greatly modified or filled in by collapses; it is for instance the case of the "Aven des ours", or Bear Swallowhole; it is also the case of several other cavities which completely disappeared because of the development of built-up areas.

The Rifian region and particularly the Rifian limestone range is still very unevenly investigated. For example - not any cavity was explored to date in the Tetouan Haouz, a range 40 Km long and 1 to 4 Km broad, extending from the Jbel Moussa (848 m) near the Gibraltar Strait in the North, to the "Hercules columns" and Tetouan in the South. Similarly the Bokoyas Massif, located in the Eastern Rifian region, is still poorly known; its karstification may be limited but further exploration of a partly known cave should be worthy undertaken by diving. Last, if several cavities of the Rifian limestone ridge are known in the North, such as Khef Gandous (- 88 m) in the Jbel Bou Zeitoun, but no penetrable subterranean water circulation has been discovered to date. Several cavities occur in the Oued Laou Gorges but the Ghar Knadel is the only one already explored. Finally the South-Eastern Rifian region, where the most expanded massif of the dorsal range occurs and exhibits the most important karstifications in the Khef Toghobeit (- 732 m), some 180 cavities are known!

In the High Atlas most known caves are those located near main roads, even if the Jurassic limestone strata are more than 100 m thick, particularly in the High Tessaout Valley where we recently discovered the occurrence of interesting but still unexplored new caves. A long and exacting task, sometimes in hard



conditions including long and difficult walks to the sites, are often necessary for a complete survey of most karstic areas located far from tracks.

In the Middle Atlas, a Moroccan-French collaboration led in 1997-98 to the discovery of several new cavities in the neighbourhoods of the Red Cave, "Chaara".

Concerning Biospeleology, since the "13th International Symposium of Biospeleology", held in Marrakesh in 1997, a particular attention was devoted to the fauna of cave, swallow holes and other subterranean habitats. In particular subterranean rivers and lakes also appear as refuges housing a remarkable biodiversity of aquatic species. The study of this fauna recently undertaken will lead to the knowledge of an unexpected animal diversity and, we hope, to a better understanding of the functioning of karstic ecosystems in our latitudes.

In conclusion, some important cavities have to be visited again, several diving surveys are urgently necessary, since the origin of subterranean waters of the two main exurgences in Morocco, the Oum Erbia Spring and the Assif Asserdoun Spring, are still completely unknown. Great parts of several karstic massifs are still unexplored and the number of caves to survey is probably high. On the other hand we have still to regret a real delay concerning the publication of speleological results but Moroccan young speleologists are well disposed towards new collaborations either in field work or for the publication of former results.

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