Hydrogeological heritage in Languedoc and Roussillon: the role of the National Inventory of the Geological Heritage

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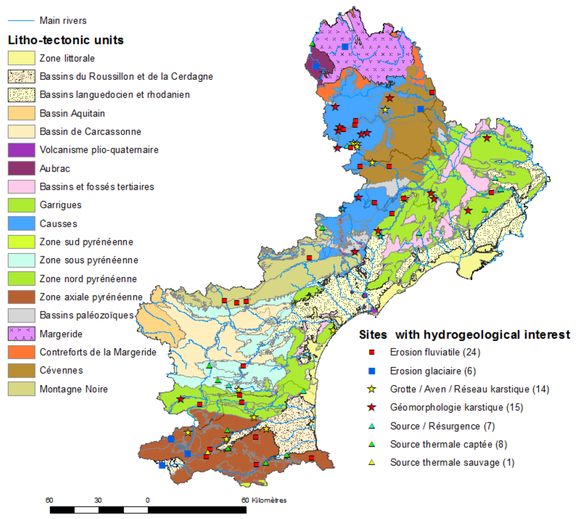
Since the law of February 27th, 2002 in France, the geological heritage is an integral part of the great natural heritage inventory established for the entire land territory, fluvial and marine (Article L. 411-5 of the environmental code). In Languedoc and Roussillon, this inventory has begun in 2008 and continues today. It was conducted by members of the CRPG[4], regional geologists, BRGM [1] and DREAL[3].

2

- The geologic heritage of Languedoc-Roussillon is one of the richest in France, by its diversity and its abundance. 253 remarkable geological sites representing 3 580 km ² (13 % of the regional territory) were listed; they restore the history of the Earth over the past 600 million years .



- More than 30% of these sites have been identified for their hydrogeological relevance and associated phenomena (thermalism, karst process, fluvial erosion…). These are springs, swallow holes, caves, canyons, kart systems, poljes, potholes… essentially located on mesozoïc carbonate rocks. However, some of them, such as hot springs along the Têt River valley, emerge along a polyphased fault in paleozoic granitic units or in paleozoic cover.

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- The fluvial erosion especially active during the Miocene and Quaternary is at the origin of the most spectacular landscapes in Languedoc and Roussillon. It entrenched Mesozoic limestone formations (Tarn, Jonte, Gardon, Céze canyons) but also the Paleozoic metamorphic formations (Heric canyon in Montagne Noire, Carança canyon in Pyrenees…).


Gorges du Tarn (Lozère)

The Tarn river entrenched a deep canyon showing the stratigraphic succession of the Middle- to the Upper Jurassic. During the Miocene, the uprising of the Cevennes and the messinian crisis allow the development of nested karst systems and canyon incision. The Tarn river is only fed by underground tributaries: forty springs from karst system of the Méjean and Sauveterre plateau (Causse).

4

- The Mesozoic carbonate formations show many karst features, in particular, in the Causses, alternate canyons, caves, cirques, poljes, karst systems, springs.....


Résurgence de Bramabiau (Gard)


Aven de la Barelle (Lozère)

5

- Because of its geological characteristics, Languedoc and Roussillon have many springs of karst origin (Lez, Fou de la Vis, Fontaine de Nîmes…). Foux de la Vis is one of the largest karst springs (rate from 1 to 15 m^3/s), emerging in the middle part of the Vis canyon, a river without perennial flow for nearly 10 km upstream. The spring emerges from a 10m long cave, ending with a vaucluse-type conduit, explored by diving on 2984 m up to 90 m below the entrance level.


Fou de la Vis(Gard)

- In the Eastern Pyrenees, the sodi-calcic hot springs (43-75 ° C) captured or wild are abundant in the valley of the Tet. They emerge along a major polyphased active fault during Variscan and Alpine orogenies. In this valley, springs are exploited for thermal or recreational activities.


Sources thermales du Figuier (Pyrénées Orientales)

6 Conclusions

- The diversity of hydrogeological heritage in Languedoc and Roussillon reflects the exceptional geological diversity of this territory. The inventory of geological heritage is an essential tool to enhance knowledge, develop educational actions, preserve and sustainably manage our regional territory. In France, a decree “Geotope Protective Order" is planned. Just as the flora and fauna, it will legally protect remarkable geological sites listed in the inventory in order to preserve them for future generations.