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## Salt activity and diapirism during the Paleogene in the Baronnies Orientales (South-East basin, France) : paleogeographic and structural implications.

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The external Alps record a whole Wilson cycle that began at early Mesozoic times by an extensional phase leading to the deposition of thick marine deposits upon an upper Triassic basement including a thick salt layer. Several diapiric structures (e.g. Astoin, the Barre de Chine ; Célini et al., 2020) are the witnesses of this important salt activity during deposition and the subsequent deformation through the Lower Jurassic. Otherwise, Triassic salt allowed thrusting on several decollement levels and emplacement of major thrust units, such as the "Nappe de Digne" or the Authon thrust sheet, during the alpine phase s.s, initiated at the Oligocene-Miocene boundary. Between these two periods, the external Alps story is more uncertain and none salt activity has been clearly demonstrated except westwards in the Vocontian basin. In the whole South-East basin, only few clues, as bipyramidal quartz found in Priabonian deposits in the western Baronnies suggest a potential salt activity at surface during the Paleogene. However, in the St-Geniez areas, some Oligocene sediments, located at the vicinity of salt structures suggest a potential diapiric growth during this period. Indeed, some stratigraphic gypsum beds are found in an Oligocene lacustrine series, directly thrust by the Authon thrust sheet. None evaporite environments are described in the whole region at Oligocene times, which suggest a possible recycling of Triassic evaporites.

In order to determine if these deposits are related to a Paleogene salt activity, a multi-analytical approach was used. First, a field study allowed characterizing the facies and the sedimentary filling and defining the stress regime during the deposit, by kinematic inversion on fractures which indicates a constant N-S compression during the Oligocene. The presence of halophilic fauna at the base of the lacustrine series of the St-Geniez area attests for saline influences during deposit. Moreover, 4km to the SW, a wedge in the conglomerates of the alpine continental molasse (so called red molasse) resting directly on Sorine's Triassic diapir was put forward. Cargneules and dolomites from the Triassic constitute an important part of the reworked material. These observations indicate that the Sorine's diapir was active during the deposition of the Oligocene series. Then, a precise chemostratigraphic framework was determined by use of  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  isotopic data on the lacustrine limestones.  $^{87}\text{Sr}/^{86}\text{Sr}$  isotopic ratio on gypsum beds of the lacustrine

series aimed at determining their ages and a possible Triassic evaporite sourcing. Our results gave an age ranging from 6 to 23 Ma, which does not correspond with the Oligocene age of the overlying and underlying sediments. Moreover, the large variation in isotope ratios suggests that this gypsum did not come from primary precipitation but from leaching of a pre-existing evaporite source. In conclusion, field observations, together with geochemical analyses, made it possible to highlight the relationships between tectonics, salt tectonics and sedimentation and also to reconstruct the paleogeography of the region at the end of the Paleogene.

### *References*

*Célini, N., Callot, J.P., Ringenbach, J.C., Graham, R. (2020,). Jurassic salt tectonics in the SW sub-Alpine fold and thrust belt. Tectonics*