



## **Relationships between AMS fabric acquisition and fluid circulations in extensional regime on the Maltese archipelago**

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In this study we report measurements of both magnetic fabric (Anisotropy of Magnetic Susceptibility) and magnetic mineralogy in Globigerina limestones of the Maltese Islands, which have been deformed by extension from Miocene to present times. These islands are affected by major plurikilometric scale normal faults that crosscut both limestones and overlying Blue Clays formation. At a smaller scale a regular joints and fractures network are also identified in the Globigerina Limestones. The whole system is associated with paleofluid circulations, and several episodes of fluid flows are evidenced by pale-yellow (oxidized) to pale-grey (reduced) color of the limestone formation depending of the degree of oxidation. AMS fabrics study in association with rock magnetic mineralogy investigations allow us to show that Globigerina Limestones have recorded well-defined magnetic lineation parallel to the tectonic stretching. On the other hand magnetic mineralogy shows that pal-gray limestones are magnetite-rich whereas pale-yellow limestones are goethite-rich. The analysis of the relationships between the macroscopic features of the fluid circulations and the distribution of both magnetic mineralogy and magnetic fabric leads to identify two main episodes of flow associated to oxidizing conditions, before and after the regional tectonic extensional event. We also show how some flows associated to goethite crystallization may alter magnetic fabric of tectonic origin.