Thermal structure as revealed by RSCM temperatures

In order to compare the geometry and the thermal structure of Ikaria, we performed a cartographical analysis of peak metamorphic temperatures (Tmax) based on the RSCM method (Beyssac et al., 2002).

Distribution of Tmax (see Figure 2a for sampling map) depends on:
- The structural position within the metamorphic succession (Figures 3c, 3d and 4c). The presence of major shear zones (Figures 3d and 4d)
- The distance to the main inversion body (Figure 3b)
- The proximity of major shear zones (Figures 3d and 4d)

We show that Tmax decreases toward the top of the structure and increases close to the Rücken grade. A temperature gap is also highlighted in the same structural position as the Agios Kirykos detachment.

Deformation and kinematics in Ikaria unit

Deformation in Ikaria is characterized by an overall N-S stretching. Ductile deformation is mostly weak and symmetric in the core of the deformation domain and becomes strong and asymmetric toward the detachments, associated with a top-to-the-North sense of shear. Interests, striking as sinistral in the strike-slip field by inversion of fault slip, differ in the NE-SW shear field (Figure 3).

The Fanari detachment and the deformation in the two upper-most units

The Fanari detachment (left photo) and weak parallel-stretching folds of S0 (right photo) (here in quartzites)

Conclusions

- The eastern part of Ikaria is a structural and thermal dome, outlined by magnetic bodies.
- It is structured by two major structures considered as detachments. The Agios Kirykos detachment is responsible for the T gap between two metamorphic units. The Fanari detachment juxtaposes sediments on metamorphic units.
- Deformation is represented by a NMS-MSH stretching in both the ductile and brittle fields. It achieved in a non-repetitive regime, as imposed by brittle faults.
- Fresh exhumation is completed by the two detachments, operating in the ductile and then the brittle field.
- Conclusions permit to consider Ikaria as an Aegean magmatite-cored metamorphic core complex such as found in western Turkey and in NE Spain. As such, Ikaria (Beyssac et al., 2002).

References


Acknowledgments

Our hypothesis, shared with Kumerics et al., (2005), is to consider this contact as a tilted detachment and that the exhumation is vertical. The syn-tectonic thinning is associated with a NE transport of the basement.

Figure 5: Stretching lineation map. It is also showed stereographic projection of extensional lineations of Ikaria Island.