Late Miocene faulting in the Cyclades: offshore-onshore faulting patterns and U-Pb dating on calcite.

Frédéric Gueydan*[1], Dimitri Sakellariou , Agathe Faucher[2], Jean-Louis Paquette , and Françoise Roger

[1]Géosciences Montpellier – Université Montpellier - CNRS – France
[2]Géosciences Montpellier – Université de Montpellier – France

Résumé

Aegean extension started in Eocene/Oligocene times and led to thinning of the upper plate in a retreating slab system. The style of extension remains controversial, with a majority of studies arguing for extension accommodated by low angle extensional brittle-ductile faults, called detachments. In other hands, the present-day active seismic faults in the Aegean are only high-angle normal faults and dextral strike slip. We aim at constraining and dating the style of faulting in central Greece by combining analysis of 19 offshore seismic lines with structural observations on Syros Island and U/Pb datation on Calcite in major fault zones in Syros. We identify three main sets of faults: NW-SE trending normal faults, NNW oblique (sinistral)-normal faults, and NNE-SSW trending dextral strike-slip faults. High angle normal faults define regularly spaced horst and graben, suggesting wide rifting style of extension. Dextral strike slip faults are found in Syros and mainly offshore and are kinematically compatible with the normal faults. U/Pb datation on Calcite in normal fault gouge in Syros provides unequivocal ages at 10 Ma for the activity of high angle normal faults. On these bases, we propose that wide rifting accommodated Aegean extension when trench retreat accelerated in Mid/Late Miocence (making Metamorphic Core Complexes and detachment faulting less efficient). At that time, dextral strike-slip faults accommodate, in the internally extending Aegean plate, Anatolia extrusion that also started around 15 Ma.

Mots-Clés: Aegean extension

*Intervenant