3-year PhD project between the University of Potsdam and the University of Rennes: Crustal deformation and basin evolution in the South Balkan subduction–collision transition zone

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The South Balkan region experiences both extensional and compressional deformation in response to the convergence between the eastern Adriatic - northern African plates and the European plate. In northern Albania, the Shkoder-Peja Fault System (SPFS) marks the boundary between the obliquely colliding Dinarides orogen to the north and the Hellenides orogen to the south. This fault system also defines a roughly 30° clockwise oroclinal bend, related to south-westward retreat of the Hellenic subduction zone. Farther south in Greece, the Kefalonia Transfer Fault (KTF) represents another major tectonic boundary, separating continental subduction of the continental Adriatic Plate to the north from rollback subduction of the Ionian and eastern Mediterranean oceanic lithosphere to the south. This tectonic transition between subduction and collision, which itself varied in space and time, has resulted in complex deformation patterns between the SPFS and KTF, both within the crust of the overriding plate - including the formation of flexural and extensional sedimentary basins in the internal parts of the orogen - and in the deeper subducting slab. The extent of which upper plate deformation is coupled with slab dynamics and how it is influenced by paleogeographic and structural inheritance is still not well constrained.

This PhD project aims to provide new quantitative data on structural deformation and sedimentary basin evolution between the SPFS and KTF, especially in Albania and North Macedonia, to develop a model of crustal deformation and identify the controlling processes. The planned research activities include: (1) Compiling and acquiring structural data during field campaigns to characterize the deformation in the study area, (2) Analysing sedimentary basins using geological and geophysical data to quantify basin subsidence and reconstruct paleoenvironments since the Oligocene, (3) Reconstructing the region's paleogeographic evolution and modelling crustal deformation as part of a plate kinematic model, using GPlates software. This project will be carried out in close collaboration with the German research program on Adriatic Plate deformation (DFG-funded SPP 2497 - DEFORM) and the European initiative AdriaArray.

Funding for a 3-year PhD position is available through the University of Potsdam and the French-German Chair (Universities of Rennes and Potsdam), supported by the French-German University (UFA-DFH). The PhD will be a co-tutelle between Rennes and Potsdam with time spent at both institutions. We are seeking motivated MSc graduates in geosciences, ideally with experience in tectonics, sedimentology and numerical modelling (GIS, GPlates). To apply, send a motivation letter, academic CV and addresses of two potential references to the main supervisor: eline.lebreton@univ-rennes.fr. We are looking to fill this position as quickly as possible; the deadline for applications is October 1st, 2025.

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