The French Margin Group, "*Action Marge*"

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Rifted continental margins form by the interplay of tectonic, magmatic and hydrothermal processes leading to continental break-up and seafloor spreading. Research into the formation of deep-water rifted margins is currently undergoing a paradigm shift. The discovery of exhumed sub continental mantle and hyper-extended crust devoid of significant normal faulting directly overlain by shallow marine sediments is proving fundamental in defining how continents rupture and oceans form. These new observations challenge existing plate tectonic concepts and question the concepts presently used to describe and quantify isostatic movements and the rheology of the extending lithosphere.

Rifted margins also represent archives of the past and present climate changes and related environmental changes recorded in the thick sedimentary sequences. More recent studies suggest that magmatism and serpentinization related to continental break-up may have a strong environmental impact.

Last but not least, rifted margins host hydrocarbon resources on which modern societies and industry rely and may also represent the locus for future CO2 sequestration. The discovery of some of the world biggest oil fields in deep water rifted margins shows that they may also represent one of the last frontiers in the hydrocarbon exploration.

For all these reasons, research on rifted margins is of societal, economic and scientific importance. Due to the development of new imaging techniques and numerical modelling approaches the research at rifted margins became more quantitative and therefore also more predictive. These new developments are, however, only possible in successful joint ventures between academia and industry. Modern research on rifted margins includes all different communities within Earth Sciences, develops collaborations with Biological, Oceanographic and Engineering Sciences, and links basic and applied research in order to better understand and make use of our resources and protect our environment.

Scientific themes:

The "Action Marges" promotes research activities and collaborations between researchers working on rifted margins within the French community. Two major scientific questions guide the research of the program:

1) How do tectonic, magmatic and hydrothermal processes interact during continental rifting and break-up and how are they recorded in the syn-to post-rift sedimentary record of rifted margins

2) How and when do sediments form, how do they travel and how, when and where are they finally deposited (source to think) within rifted margins”

Finding answers to these questions are critical to understand, interpret and predict geological processes that are of societal and economic importance such as distribution of mineral and hydrocarbon resources, earthquakes and predictions of climate and environmental changes.

In order to successfully answer to these questions and to develop technically ambitious research projects and foster collaborations between the French research groups, the “Action Marges” focus their research initiative into two sites (western Mediterranean and the Aden-Afar) and four “themes”.