



Heat flow anomalies on the Western Mediterranean margins: first results from the WestMedFlux-2016 cruise

Jeffrey Poort (1), Francis Lucazeau (2), Virginie Le Gal (3), Marina Rabineau (4), Michela Dal Cin (5), Abderrezak Bouzid (6), Desirée Palomino (7), Estelle Leroux (8), Grigory Akhmanov (9), Anne Battani (3), Roza Si Bachir (6), Oleg Khlystov (10), Aleksandre Koptev (1), and the WestMedflux Team

(1) UPMC-Sorbonne Universités, IStEP, Paris, France (jeffrey.poort@upmc.fr), (2) IPGP, Paris, France, (3) IFPEN, Rueil-Malmaison, France, (4) IUEM, Brest, France, (5) OGS, Trieste, Italy, (6) CRAAG, Alger, Algeria, (7) IEO, Malaga, Spain, (8) Ifremer, Brest, France, (9) MSU, Moscow, Russia, (10) LIN, SBRAS, Irkutsk, Russia

While there is now a large consensus that Western Mediterranean basins developed in a Miocene back-arc setting due to slab roll-back and that some of its domains are floored by oceanic crust, there is still a lot of speculation on the configuration, nature and evolution of its margins and the ocean-continent transitions (OCT). A thick Messinian layer of evaporites in the deep basin obscures deep seismic reflectors, and only recently seismic refraction and wide-angle studies revealed a confident picture of basement configuration. In order to further constrain models of crustal structure and margin evolution, heat flow is one of the key parameters needed. Recent heat flow studies on other margins have shown the existence of a persistent thermal anomaly under rifted margins that urges to reconsider the classical models of its evolution. The young age of OCT and ceased oceanic formation in the Western Mediterranean make it an interesting test case for a thermo-mechanical study of its margins. The presence of halokinetic structuring and salt diapirs urges the need of close spaced heat flow measurement to evaluate heat refraction and advective heat transfer by fluid migration.

During the WestMedFlux cruise on the research vessel L'Atalante, we collected a total of 150 new heat flow measurement (123 in pogo mode, 27 with a sediment corer) in the deep basin of the Western Mediterranean where heat flow data were sparse. Preliminary analysis of the heat flow data confirms two regional trends: in the southern Provençal basin an overall increase from west to east (from about 60 mW/m² at the Gulf of Lion towards 75 mW/m² at the West-Sardinia margin), while in the northern part of the Algero-Balearic basin heat flow increases from east to west (from about 80 to 100 mW/m²). On this regional trends, several local anomalies are clearly differentiated. In the deep oceanic basin, strong anomalies seem to be merely associated to salt diapiric structures. On the OCT and on the rifted continent, both strongly reduced and elevated heat flow are observed and suggest other heat sink and sources. We will discuss on the different processes that might have affected the surface heat flow (e.g., bottom water currents, slope instabilities and focused fluid migrations) and try to link the large scale heat flow patterns with crustal nature, structuring of the margins and mantle dynamics.