

Structural development of the Dieppe-Hampshire Basin (Eastern English Channel): Contribution of new seismic data

Martin Jollivet-Castelot (1), Virginie Gaullier (1), Fabien Paquet (2), Frank Chanier (1), Isabelle Thinon (2), Eric Lasseur (2), and Olivier Averbuch (1)

(1) Univ. Lille, CNRS, Univ. Littoral Côte d'Opale, UMR 8187, LOG, Laboratoire d'Océanologie et de Géosciences, F59000 Lille, France (martin.jollivetcastelot@gmail.com), (2) Bureau de Recherches Géologiques et Minières (BRGM), Georesources Division - Sediment - GBS Unit, F45060 Orléans, France

The Dieppe-Hampshire Basin is a Cenozoic basin crossing the eastern English Channel, between SE of England and the French coast. This basin and its borders developed during the Cenozoic, a period of overall tectonic inversion, in response to the opening of the North Atlantic Ocean and Pyrenean-alpine deformation episodes. Both extensional and subsequent compressional deformations within this area involve the reactivation of older major regional structures, inherited from the Variscan Orogeny. However, the detailed structural development of the Dieppe-Hampshire Basin still remains poorly constrained, as well as the detailed stratigraphic framework of Cenozoic series, notably in terms of seismic stratigraphy and sequence stratigraphy.

New very high resolution seismic data, acquired during the oceanographic cruise "TREMOR" (R/V "Côtes de la Manche", 2014, 1800 kilometers of Sparker profiles), and bathymetric data from SHOM and UKHO, have allowed to image the sedimentary filling and tectonic structures of the Dieppe-Hampshire Basin and adjacent areas. The interpretation was first focused on a seismic facies analysis that led to evidence numerous unconformities and seismic units ranging from the Upper Cretaceous to the Bartonian (Late Eocene). The interpretation of the seismic profiles also allowed to map precisely many tectonic features, as faults, folds and monoclinical flexures. Thanks to the new data, we especially imaged the complexity of the deformation within the highest tectonized zones of the region, along the Nord-Baie de Seine Basin and offshore the Boulonnais coast with an unprecedented resolution. The expression of the deformation appears to be very different between the Mesozoic and the Cenozoic series, with prevailing folding affecting the Cenozoic strata whereas the Mesozoic series are predominantly faulted. This deformation pattern illustrates two major structural trends, respectively E-W and NW-SE directed, both syn- to post-Bartonian in age. The first one is consistent in age and orientation with a late Pyrenean or early Alpine deformation phase, while the second one appears to have a different origin, in regards to the overall geodynamic framework. We suggest that the major heterogeneities of crustal blocks underlying the basin played an important role on the development and orientations of these deformations.

These preliminary results will be improved soon thanks to a new cruise, "TREMOR 2" (2017), which will be focused on the acquisition of new VHR seismic lines, bathymetric data and coring.