

---

# Reconstruction of the timing and location of the Mediterranean Outflow Water from the Late Miocene to Holocene around the Iberian Peninsula

Emmanuelle Ducassou\*<sup>†1</sup>, Paul Moal-Darrigade, Viviane Bout-Roumazeilles<sup>2</sup>, Carlos Alvarez Zarikian<sup>3</sup>, Mathilde Fauquet<sup>1</sup>, Esther Luc<sup>4</sup>, Rachel Flecker<sup>5</sup>, Trevor Williams<sup>6</sup>, and Science Party Expedition 401

<sup>1</sup>Environnements et Paléoenvironnements OCéaniques – Ecole Pratique des Hautes Etudes, Université de Bordeaux, Institut National des Sciences de l’Univers, Centre National de la Recherche Scientifique – France

<sup>2</sup>Laboratoire d’Océanologie et de Géosciences (LOG) - UMR 8187 – Institut National des Sciences de l’Univers, Université du Littoral Côte d’Opale, Université de Lille, Centre National de la Recherche Scientifique, Institut de Recherche pour le Développement – France

<sup>3</sup>International Ocean Discovery Program, Texas AM University – États-Unis

<sup>4</sup>Environnements et Paléoenvironnements OCéaniques et Continentaux – CNRS : UMR5805 – France

<sup>5</sup>University of Bristol, School of Geographical Sciences – Royaume-Uni

<sup>6</sup>International Ocean Discovery Program, Texas AM University – États-Unis

## Résumé

The sedimentation of the middle slope of the Gulf of Cadiz and the Atlantic margin offshore Portugal is strongly influenced by the flow of a bottom current originating from the Mediterranean: the Mediterranean Outflow Water (MOW). Understanding interactions between the MOW, the Atlantic Meridional Overturning Circulation (AMOC) and climate variability in the North Atlantic is complex and important scientific challenge. Analyses of sedimentary characteristics of contourite drifts in the Gulf of Cadiz and offshore Portugal provide valuable information on the variability of bottom current patterns, with the aim of understanding the dynamics of the MOW since the Late Miocene. This study is mainly based on sedimentary archives collected during the Integrated Ocean Drilling Program Expedition 339 "Mediterranean Outflow" (2011–2012) and various sedimentary cores collected during the CADISAR oceanographic mission (2001) for the Pleistocene and Holocene periods. Preliminary results from IODP Expedition 401 "Mediterranean-Atlantic Gateway Exchange" (2023–2024) will provide the onset characteristics of the MOW (Late Miocene and Pliocene) from two sites located at both sides of the present Gibraltar Strait. The sources of the clay minerals contributing to the deposits of the Cadiz contourite system (fluvial inputs from the Guadalquivir River and North African aeolian dust) highlight the roles of surface ocean circulation and MOW flow during the Pleistocene. Dated by a novel isotope stratigraphy, ostracod assemblages as well as clay mineralogy and grain size measurements carried out at high resolution on sedimentary archives collected at various depths along the Cadiz contourite depositional system and its continuation offshore Portugal have allowed us to refine the MOW circulation over the Late Miocene, Pliocene and Pleistocene.

---

\*Intervenant

<sup>†</sup>Auteur correspondant: emmanuelle.ducassou@u-bordeaux.fr

**Mots-Clés:** contourite, Mediterranean Outflow, Iberian Peninsula, 8 Ma, IODP Expedition 401