

MUD VOLCANOES IN THE WEST ALBORAN BASIN: AGE VARIATION OF SOURCE SEDIMENTS, RECENT MUD VOLCANIC ACTIVITY, AND THEIR ROLE IN PALEOECOLOGY.

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Abstract

Our micropaleontological investigation on the mud breccia matrix from three mud volcanoes in the Alboran Sea (Western Mediterranean) reveals that the extruded sediments are from olistoliths of different ages contained in the main olistostromic complex. The ages of their more recent activity has been dated with AMS ¹⁴C. The mud breccia acts as an ideal substratum for cold-water coral colonies, whose development is, however, not linked to seepage activities.

Keywords: Alboran Sea, Mud Volcanoes, Foraminifera

The Dhaka, Maya and Carmen mud volcanoes (MV), located in the Mud Diapir Province in the Western Alboran Basin along the Moroccan Coasts were cored during the TTR-17 Leg 1 research cruise. Cores were taken on the top of mud volcanoes at Dhaka (water depth of 370 m) and Maya (water depth of 410 m) and on the flank at Carmen MV (water depth of 806 m).

Recent volcanic activities have been dated by mean of AMS ¹⁴C. At Maya MV the most recent activity is as old as 15583 +/- 185 yrs BP. At Dhaka MV the most recent volcanic activity occurred between 4346 +/- 60 yrs BP and 4165 +/- 62 yrs BP.

Mud diapirism and mud volcanism in the area are supposed to originate in the lowermost sedimentary sequence on the basis of both seismic interpretation [1] and micropaleontological analysis of the extruded mud breccias [2]. A new micropaleontological study was undertaken to better constrain the age of the source sediments.

At Dhaka MV the planktonic foraminiferal assemblages present in the mud breccia matrix result to be mostly composed by rare Recent-Holocene forms and more abundant mixed Late Cretaceous (Lower and Late Maastrichtian), Miocene (generally Serravallian) and Pliocene species. Late Eocene and Oligocene specimens, together with very rare shallow water benthic forms such as *Amphistegina* sp. and *Elphidium* spp. are also documented.

At Maya MV planktonic foraminifera of Late Cretaceous (Campanian - Maastrichtian) are dominant, while Miocene and Oligocene forms are very rare. Shallow water specimens of *Elphidium* are present but generally rare.

At Carmen MV the mud breccia contains dominant planktonic foraminifera from Zones N8-N10 (Middle Miocene). Late Cretaceous species are very rare and only very rare specimens of Upper Albian species have been observed. Shallow water species include *Ammonia beccarii* and *Elphidium* spp.

Based on these observations we identify the lowermost olistostromic sedimentary unit present in the Alboran Sea and documented in [1] as the main source of the extruded material at Dhaka, Maya and Carmen Mud Volcanoes [2]. We also suggest that the age difference in the source sediments of the three mud volcanoes is due to the presence of olistoliths of different ages in the main olistostromic complex.

On top of the mud breccia extruded by both Dhaka and Maya MVs small patch reef and/or isolated cold-water corals found an ideal substratum for colonization. However, no relation with seepage is observed at both mud volcanoes as indicated by carbon isotopes values of benthic foraminifera in the range of "normal" marine waters not affected by hydrocarbon.

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References

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