



## **GAS HYDRATES, MUD VOLCANOES AND CARBONATE CHIMNEYS IN THE GULF OF CADIZ.**

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The Gulf of Cadiz is situated in a tectonically very active region, in a complex setting near a major plate boundary characterized by a combination of important strike-slip movement (along the Açores-Gibraltar fracture zone) and compressional tectonics related to the Africa-Eurasia NW-directed convergence. This area is characterized by extensive mud volcanism, pockmarks, mud diapirism and carbonate chimneys related to hydrocarbon rich fluid venting. A large mud volcano field, first interpreted on side-scan sonar imaging and later confirmed by coring, was discovered in this area in 1999, during the TTR-9 cruise. Since then, this area has been intensively investigated by single channel seismics, long range and deep-tow sidescan sonar, underwater TV, multi-beam bathymetry, dredging and coring. The mud volcanoes are located at water depths between 700 and 3500 m, with a diameter that can reach over 4 km and whose height can reach a few hundreds of meters. Gas hydrates have already been recovered from 3 mud volcanoes. A large area covered with carbonate chimneys consisting essentially of dolomite and high magnesium calcite occurs in the northern sector, along major diapiric ridges, in an area characterized by high backscatter on the side-scan sonar mosaics. Isotopic studies indicate that these chimneys are methane related, implying the release of large volume of methane through these structures. A combined interpretation of the available side-scan sonar imaging and seismic lines (both single channel and multichannel) shows that most of the mud volcanoes area structurally controlled. In the northern sector, it is possible that the Mediterranean Outflow may have had a role in the methane release through gas hydrate destabilization.