



## **High-resolution multi-channel seismic and acoustic investigations at the Makran accretionary margin, offshore Pakistan**

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A multi-frequency seismo-acoustic dataset was collected offshore Pakistan in October 2007. The margin wedge, which is covered by a uniquely thick pile of sediments, was surveyed from the shelf edge to the abyssal plain by various geophysical profiling tools including sediment echosounder, side scan sonar, and a seismic system. On our poster we present first results from the latter, in order to give an overview of the entire study area in light of the scientific goals listed below.

The primary aim of investigations was to identify, and map, recently active fluid and gas vent locations. While such are well-known to occur at tectonically active areas (e.g. Black Sea, Middle America Subduction Zone), the influence of such a thick sedimentary cover on the fate of fluids and the nature of expulsion has been a matter of speculation.

Another intriguing scientific goal concerns the structure and dynamics of Makran vent sites. Their variation as a consequence of local seafloor features such as nearby faults, canyons, and slumps, is studied in detail.

First results indicate the presence of over a dozen active gas and fluid seep sites on the Makran accretionary margin. They are manifested in form of gas flares in the water column, seafloor locations of high backscatter, shallow gas accumulations within the sediments, and active pathways along tectonic boundaries, often in connection with

one another. Seeps occur along the entire surveyed area from the shelf edge to the proto deformation zone in as much as 3000 m water depth. Investigations show that intense deformation allows upward gas migration especially near the diapiric ridges, where gas enters the gas hydrate stability field locally.

The unique dataset of simultaneously acquired side scan and seismic profiles allows joint geological interpretation and thus contributes significantly to our present understanding of this tectonically unique setting.