



Giant mudwaves in the Northern Argentine Basin: born and buried by bottom currents

Dmitrii Borisov, Ivar Murdmaa, Elena Ivanova, and Oleg Levchenko

P.P. Shirshov Institute of Oceanology, RAS, Moscow, Russian Federation (dborisov@ocean.ru)

New sedimentary records and very high resolution seismic profiles collected during four cruises of the RV “Akademik Ioffe” (2011-2013) were correlated with seismic, multibeam and coring data obtained during cruises of the RV “Robert Conrad”, “Knorr”, “Meteor”. A complex analysis of the geological-geophysical data revealed an extensive field of giant mudwaves (48 000 km²) in the northwestern Argentine Basin, South Atlantic. The symmetric waves up to 60 m in height and 4000 m in wavelength are oriented roughly parallel to contours. They partly cover the Santa Catarina Plateau and extend through the Santos Basin to the Sao Paulo Plateau. The mudwaves field is traced at the depth range from 3400 to 4000 m and divided into buried (northern) and non-buried (southern) parts. The non-buried sediment waves cover the surface of the huge drift in the Santa Catarina Plateau. The wave height increases from the drift summit to its flanks and decreases at the foot. Two cores retrieved from the drift top and its northern flank recovered muddy contourites with a greater amount of silt-size material in the core from the drift flank. The age of the recovered sediments is at least 130 ka. In the northern Santos basin, the sediment waves are buried under a large lens-like sediment body (drift?) inclined at the margins. Cores obtained from the buried part of the mudwaves field recovered an intercalation of hemipelagic clay and silty-clay contourite. The age of recovered sediments does not exceed 150 ka (Bleil et al., 1993).

Contourites deposition in the study area is related to the activity of the Antarctic bottom water (AABW) contour current. The AABW flow is considered to be divided into two branches by the Santa Catarina Plateau. We suggest that this topographic obstacle causes a flow velocity increase. Wave height and grain-size variations indicate higher bottom current velocities at the plateau flanks and relative tranquil conditions at the flat summit of the plateau. The symmetric shape of the mudwaves suggests either a low average current velocity (< 9 cm/s) during the last 130 ka or frequent changes in the flow direction.

Burial of the northern part of mudwaves field was related to a considerable decrease in bottom currents velocity that resulted in a short-term cessation of contourites accumulation replaced by hemipelagic sedimentation. Recovered hemipelagites are deposited during the last deglaciation, as inferred from the planktic foraminiferal data. Flow velocities decreased either owing to lower AABW production or to current system shifting. Buried sediment waves in the structure of the Santa Catarina drift indicate that waves formation and burial are cyclic processes characterizing the evolution of the studied contourite depositional system in the northern Argentine Basin affected by the global climate change and glacioeustatic sea level oscillation.

The study was partially supported by RFBR, research project No. 14-05-31357.

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