



Offshore-onshore correlation across Palawan Island, Philippines

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The link between the deformation of Palawan Island and its well-known adjacent wedge has been a matter of debate for a long time. This wedge bounds the Borneo-Palawan Trench to the Dangerous Grounds and to Palawan Island. From joint fieldwork by BGR, ENS and the University of the Philippines, sponsored by TOTAL, and offshore seismic data (BGR84-128, SO27-33/33a) a regional cross section was performed. The section runs in a NW-SE direction from Reed Bank, across the northern part of the southern segment of Palawan Island, and across the NW Sulu Sea to close to Cagayan Ridge.

From west to east the section covers the attenuated continental crust of the Dangerous Grounds, the Borneo-Palawan Trench, and the accretionary wedge to the west of Palawan Island. Onshore central Palawan there are mainly ophiolites that were overthrust onto the island. Additionally, there are some carbonate sequences and clastic sediments, mainly fine grained sandstones with some gypsum and calcite. In the Sulu Sea there is a distinct SE-dipping reflection beneath a Middle Miocene unconformity.

Offshore, in the South China Sea, the top of the downward bent plate is marked by the distinct reflection pattern of the Nido limestones, that are described onshore as St. Pauls limestone (top is ~ 16 ma). The main deformation and (half-) graben formation affecting the Dangerous Grounds terminated before the formation of the Nido limestone (base is ~ 31 ma). Locally, younger strike-slip faulting occurred and resulted in deformation that includes the Nido Formation. This strike-slip motion was accompanied by a moderate transpressional component. Overlying clastic sequences comprise the Matinloc and Pagasa Formations. The wedge in front of Palawan Island is known as the thrust Eocene Pulute Formation. The two clastic formations, Matinloc (top is 7.8 ma) and Pagasa (top is 14 ma) are not part of the wedge. However, the Pagasa FM is affected by deformations related to the wedge formation.

Onshore, the Tabon Limestone (top is 5.1 ma) lies unconformable upon the ophiolites and was affected by two folding events. The first folding in NE-SW-direction, resulting in a tight anticlinorium parallel to the strike of the island, was followed by a second, more gently sag-folding perpendicular to the first one, resulting in a saddle structure.

Based upon several outcrops and measurements of the structures, we were able to correlate the onshore lithologies (e.g. Tabon Limestone) in the area of Quezon with the interpretation of the seismic lines.

The Tabon Limestone can be traced offshore towards the west until the edge of the accretionary wedge in front of Palawan. The seismic image shows clearly that the Tabon Limestone is not affected by the wedge in the offshore area. It lies undisturbed and unconformable on the thrust rocks of the wedge. These results suggest that the uplift and folding of Palawan Island postdates the formation of the wedge which constitutes the southern edge of the South China Sea.