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Seismo-stratigraphic evolution of the northern Austral Basin and its possible relation to the Andean tectonics, onshore Argentina.

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The Austral Basin is situated in a formerly and recently high active tectonic zone in southern Argentina. The opening of the South Atlantic to the east, the opening of the Drake Passage in the south, and the subduction related to the rise of the Andes to the west, had major influence on the study area. To identify the impact of the tectonic events on basin geometry, sediment thickness and depocenter migration through time, 2D seismic interpretation was performed for an area of approx. 180.000 km^2 covering the onshore northern Austral Basin.
A total of 10 seismic horizons were mapped and tied to the stratigraphy from well reports, representing 9 syn- and post- rift sequences. The main units are: Basement (U1), Jurassic Tobifera Formation (U2), Early Cretaceous (U3), Late Cretaceous (U4), sub-unit Campanian (U4A), Paleocene (U5), Eocene (U6), Oligocene (U7), Miocene (U8), and Plio-Pleistocene (U9). Main tectonic events are identified representing the break-up phase forming graben systems and the evolution from the ancient backarc Rocas Verdes Basin to the foreland Austral Basin.
Inversion and changes in the tectonic regime are concomitant with onlapping and thinning of the base of the Upper Cretaceous to Campanian sediments, while the Top of the Upper Cretaceous represents a Maastrichtian unconformity. Units depth maps show a triangular geometry since the Jurassic, tracing the north-eastern basement high and deepening to the south. Since the Campanian the former geometry of basin fill changed and deepening to the south stopped. Beginning of the foreland phase is assigned to this time as well as changes in the stress regime. Paleogene times are marked by a relatively high sedimentation rate coupled with enduring thermal subsidence, on-going rise of the Andes and changes in the convergence rates of the Nazca relative to the South American plate. Onset of sediment supply from the Andes (Incaic phase) resulted in enhanced sedimentation rates during the Paleocene, coupled with important basin subsidence at Andes foothills. An E-W transpressive deformation occurred during late Oligocene and Miocene, initiated by significant changes of plate motion between Nazca and South American plate, driving the Quechua phase of the Andean uplift. Hence, enhanced sedimentation from the rising Andes was renewed since a late Miocene unconformity.