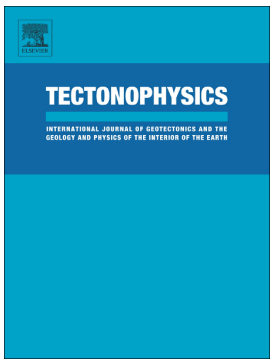

Heat flow and lithospheric thickness analysis in the Patagonian asthenospheric windows, southern South America

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Heat flow and lithospheric thickness analysis in the Patagonian asthenospheric windows, southern South America

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ABSTRACT

The lithosphere–asthenosphere boundary (LAB) is a first-order discontinuity, essential to understand the Earth composition and evolution. However, its detection has been critical and several regions still lack of coverage. Southern Patagonia, in southern most South America, is one such area, which has been affected by the subduction of a seismic oceanic ridge (South Chile Ridge) and formation of an extensive slab window since ~12 Ma. We calculate the LAB position by defining the thermal lithospheric thickness of the southernmost Patagonia using the thermal conductivity equation to estimate the surface heat flow. We used data from seventy-five hydrocarbon wells of two from the most productive petroleum basins in Argentina: the Golfo de San Jorge and Magallanes-Austral basins. Our results show the highest heat flow values in the southernmost region, over the Austral basin and core of the slab window (~70-90 mW/m^2). These values are twice as hot as global average. To the north, over de Golfo de San Jorge basin and northern margin of the slab window, heat flows are “normal” (~50-60 mW/m^2). These thermal contrasts, from south to north, agree with the kinematic reconstructions of the Chile ridge and northward widening of the slab window. These heat flows values evidence an attenuated lithospheres, which thickens