



Physical modeling of the early sea-floor spreading between Australia and Antarctica

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The separation of Australia and Antarctica and the opening of the Australia-Antarctic Basin commenced about 80 Ma after the long (70-80 Ma) rifting and mantle exhumation. The early (Late Cretaceous-Paleogene) sea-floor spreading evolved in an ultraslow regime with half-spreading rate from 6.5 mm/y between anomalies 33o and 21y and 10 mm/y between anomalies 21y and 18. The increase of the spreading rates correlates with change in basement morphology from longer to shorter wavelengths. Moreover, some indirect data denote ridge jumps during plate divergence. Geodynamic processes related to early sea-floor spreading between Australia and Antarctica were investigated at the laboratory of experimental geodynamics of the Moscow State University. The experiments were realized with use of a model substance which physical properties satisfy the criterion of similarity. Physical simulations showed dependence of the lithosphere surface morphology from spreading rates which corresponds well with observed data on the basement relief in the Australia-Antarctic Basin. The physical experiments also demonstrated jumps of spreading axis with the occurrence depending on initial structural configurations (rupture geometry). Generally, more complex initial structure facilitated axis jumps. This work was conducted under the RSF grant (Project No 16-17-10139).