113

LATE CRETACEOUS TO PRESENT DAY FORMATION OF OCEANIC CRUST BETWEEN AUSTRALIA, ANTARCTICA AND PACIFIC ILLUSTRATED BY RECONSTRUCTED FREE-AIR GRAVITY AND PALAEO-BATHYMETRY

K. Gohl[1], C. Gaina[2], G. Eagles[1]

[1]Alfred Wegener Institute for Polar and Marine Research (AWI), Bremerhaven, Germany,
[2]Norwegian Geological Survey (NGU), Trondheim, Norway

On a long geological timescale, first-order changes in palaeo-climate, palaeo-oceanography and marine sedimentation are controlled by plate tectonics through the distribution of land masses and ocean basins (geometry and geography), the opening and closing of oceanic gateways, and changes in topography both on land and at sea. The oceanic crustal age and distribution south, southeast and east of Australia illustrates the complex kinematics of major tectonic plates (Australia, Antarctica and Pacific), microplates (several blocks of the Lord Howe Rise, Campbell Plateau and Chatham Rise), and the intervening triple junctions that led to the formation of ridge jumps, long fracture zones and transform faults, and trenches. Several up-to-date models for the evolution of individual oceanic basins in this region have been merged with a South Pacific high-resolution tectonic model in order to document a detailed tectonic history of this region.

Densely spaced isochrons (1 million years) are derived from the kinematic model and refined using satellite-derived free-air gravity anomalies and bathymetry, and magnetic anomalies from ship track data. The isochrons are used to construct polygons that depict the amount of oceanic lithosphere attached to the active tectonic plates at a certain geological time. Palaeo-age and palaeo-bathymetric grids are calculated based on the new dense set of isochrons. We present animated reconstructions and use them to highlight the importance of bathymetric features and the distribution of land and sea in the opening of the Tasman gateway and subsequent development of the Antarctic Circumpolar Current (ACC).