



The role of glacial and tectonic genesis in forming of the Antarctic Peninsula's shelf topography

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The influence of endogenous and exogenous factors on the topography of the West Antarctic shelf is shown.

1. The gravity tomography models [Atlas...] show that the non-geotectonic depressions about 300 m of depth extends to the south from the Bransfield Rift along the western and eastern shelves of the Antarctic Peninsula (AP) up to 69 °S. This is due to the glacial tectonic, which was caused by lithostatic pressure of ice mass and the corresponding deviatoric stress (as horizontal stretching) in a period of an intense glaciation. Ice mass increases towards the south, therefore the deviatoric stretch and the width of the shelves increases also.

2. Besides such external factors, deep tomography data were taken into account. Results of tomographic modelling show the structure of the AP along its crest and along several cross sections. The AP body, as a single structure, is submerged into the lithospheres of the Pacific Ocean and the Weddell Sea to the depth of 150 km. Some layers of its deepened part are displaced concerning the AP's crest axis. The largest of these shifts are observed up to 50 km from the axis to the east at the latitude of 63°S at the depths of 6-7 km, then a shift up to 100 km to the west at 66°S at the depth of 9 km and at 67°S to the east up to 150 km at the depth of 13 km.

3. After breakup of the ice shelf to the west of the AP, the outflow of ice weight from the main ice board on the Peninsula increased. The consumption of the ice is evaluated now by the discharge of glaciers. Informative data for that are the satellite radar altimetry and interferometry. Several pairs of the ERS1/2 images of 1995-2008 were processed for the area of the Vernadsky Ukrainian Antarctic Station. These 100km x 100km images show 4 glaciers (Deloncle, Girard, Waddington and Collins) along transverse faults. The Collins glacier is the most active one. It starts at the crest of the Bruce Plateau at the height of 1450 m. Three smaller glaciers provide an extra feed for the main glacier. The most active discharging in the mouth of the Collins glacier takes place in January-February.

4. Sounding survey, geomorphologic and geologic surveys were carried out during of seasonal Ukrainian expeditions 1998-2008 in the region of the Argentine Islands archipelago. Detailed bathymetric and geomorphological charts were developed using the British Admiralty data of 1964-1965. The hypsometric analysis of the seabed made it possible to restore dynamics of a split of the single geological massif of the archipelago in the past. A diagram of relative velocity of the archipelago spreading process was built using an area size of the seabed for different hypsometric levels.

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