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Effect of glacial isostasy on the depth of Antarctic continental margin

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The growth and decay history of Antarctic ice sheet affected geographic formation process of the Antarctica and the margin through the Cenozoic era. Generally the depth of the continental margin around the Antarctica is about 500-900 m depth, and there is the place that reaches 1,000m in some places. Moreover, characteristics of the geography around the Antarctic continent are that the surface topography is rich for the undulations, and the coastal region is what is covered by ice shelf. In particular, the depth of the continental shelf around the Antarctica is very deep in comparison with that of the other sea areas in the world. On the other hand, the conventional geophysical observations suggest that the topography of the long wavelength of the current Antarctic continent is almost isostatic equilibrium. This implication means that the present Antarctic ice sheet as a surface load makes the Earth deform. So the reason why continental shelf of Antarctica is very deep would be that the whole Antarctic continent including the continental shelf subsided by existence of Antarctic ice sheet as a huge load on earth's surface in comparison with the other continental shelf in the world. However, very few quantitative evaluations have been reported on the relation between the depth of continental margin and Antarctic ice sheet. Various interpretation using the geographical features and geological data in land and the peripheral seabed and the numerical simulation is essential to consider the relations of ice sheet history and geographic evolution of Antarctica. Here, we show the quantitative differences of the continental depth between Antarctica and the other continent, and using the glacial isostatic adjustment (GIA) modelling, we estimate the effects of ice sheet loading on the depth distribution of the continental shelf around Antarctica.