

## Down-warping crustal structure beneath the Lake Biwa region, Japan. -A possible explanation for the driving force-

# Takeshi Kudo[1], Koshun Yamaoka[2], Atsushi Yamaji[3]

[1] Research Center for Seismology & Volcanology, Nagoya Univ., [2] RC. Seis. & Volc., Nagoya University, [3] Div. Earth Planet. Sci., Kyoto Univ.

We discuss subsurface density structures and some problems regarding isostasy in and around Lake Biwa in the Kinki district, Japan. The lake region is characterized by strong negative Bouguer anomalies. Especially, a steep horizontal gradient zone of gravity anomaly field is distributed along the western margin of the Lake. The large amount of the gravity anomaly depression (greater than 50mgals) cannot be explained only by low-density sediments beneath the lake. This large gravity depression indicates that a down-warping structure extends to the Moho depth. This conjecture has been strongly supported by short-period receiver function imaging. Moho discontinuities derived from the imaging shows the clear offset of about 8km under the steep gravity gradient zone.

A question arises as what is the driving force to create such large down-warping structure against buoyancy? We consider that the subduction of shallow slab under the region (Philippine Sea Slab) may cause the crustal deformation through the viscous flow between them. In order to verify this model, we simulated the induced mantle flow and the pressure distribution due to the subduction of the Philippine Sea Slab. This numerical experiment has provided a result that the induced flow makes a negative pressure zone under the lake region, when the slab has an offset beneath one side of the region. This offset of the slab coincides with some plate models deduced from hypocentral distributions and/or Sp phases of the deep-focus earthquakes.

Fig. 1. The calculated pressure distribution by the model that the viscosity of the upper mantle  $\mu = 10^{20}$  Pa s and the induced flow velocity along the slab - mantle boundary  $v = 3.5$  cm/year. Supposed locations of the topographic low areas, Ise Bay, Nobi Plain, Lake Biwa and Wakasa Bay, are also indicated.

