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Changes in main components of the water cycle or Lake Khanka during the 1949 - 2015 period.

Lake Khanka (or Xingkai in China) located on the border between Primorsky Krai (Russia) and Heilongjiang Province (Northeast China) belongs to the Ussuri River basin. The Lake's drainage basin is fed by 28 rivers (8 in China and 20 in Russia), but the only outflow of the Lake is the Sungach River. During the past 15 years (2000-2015) level of the Lake have increased by 1.87 m and exceeded the historical maximum during the period of observations since 1949. It resulted in flooding of river-bank areas and agricultural lands. To understand reasons of these level changes it is necessary to analyze effects of natural and anthropogenic factors that influence the Lake water budget.

During this study of the Lake water balance, we estimated contribution of different hydrometeorological variables on the changes of its level. For these analyses we used regular hydrometeorological observations within the Lake basin from 1949 to 2015. Anthropogenic effects were estimated from the water management information and from statistical and satellite data.

Analysis of the Lake level observations showed an upward tendency since the 1980s, which became most disastrous since 2000. These changes in the Lake level were accompanied by increase of the surface water inflow into the Lake. Furthermore, since 1975, increase of annual precipitation on the Lake surface has been observed. Together, with a wind speed decrease overt the Lake surface during the entire observation period, evaporation from the Lake surface has also decreased.
Anthropogenic impact on the Lake Khanka level is less evident, if compare to natural processes. In particular, during 2000-2015 the effect of natural processes on the Lake Khanka level has been more significant than of anthropogenic factors (Table). Specifically, the total surface water inflow into the Lake, precipitation at the Lake surface, and evaporation from its surface determine the lake level changes by 153 cm (or 82 % of the total change). Anthropogenic factors explain 34 cm or 18% of the Lake level changes. Among them, the effect of the Muling River flood water diversion on the Chinese territory was more important than other anthropogenic factors.cartographical layers in raster (PNG, JPG, GeoTIFF), vector (KML, GML, Shape), and binary (NetCDF) formats. Its usage for solving related to Northern Eurasia climate change research problems is illustrated.