

Monitoring on the global lakes using multi-resource data

Mingguo Ma

School of Geographical Sciences, South West University, Chongqing, China

<mmg@swu.edu.cn>

Abstract. As one of the most important geographical units affected by global climate change, lakes are sensitive to climatic changes and are considered “indicators” of climate and the environment. In this study, changes in the spatial-temporal characteristics of the water levels of 204 global major lakes are systematically analyzed using satellite altimetry data (Hydroweb product) from 2002 to 2010. Additionally, the responses of the major global lake levels to climatic fluctuations are analyzed using Global Land Surface Assimilation System (GLDAS) data (temperature and precipitation). The results show that the change rates of most global lakes exceed 0, which means that the lake levels of these lakes are rising. The change rates of the lake levels are between $-0.3\sim 0.3$ m/a, which indicates that the rate of change in the water-level of most lakes is not obvious. A few lakes have a particularly sharp change rate, between $-5.84\sim -2$ m/a or $0.7\sim 1.87$ m/a. Lakes with increasing levels are mainly located in the mountain and plateau regions, and the change rates in the coastal highlands are more evident. The global temperatures rise by a change rate of 0.0058 °C/a, while the global precipitation decreases by a change rate of -0.6697 mm/a. However, there are significant regional differences in both temperature and precipitation. In addition, the impact of precipitation on the water level of lakes is significant and straightforward, while the impact of temperature is more complex. A study of lake levels on a global scale would be quite useful for a better understanding of the impact which climate change has on surface water resources.