



Investigation of the ice surface albedo in the Tibetan Plateau lakes based on the field observation and MODIS products

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The Tibetan Plateau (TP) lakes are sensitive to climate change due to ice-albedo feedback, but almost no study was paid attention to the ice albedo of TP lakes and its potential impacts. We introduce a recent field experiment observing the lake ice albedo in TP, and evaluate the applicability of the Moderate Resolution Imaging Spectroradiometer (MODIS) products as well as the ice albedo parameterizations. Most of lake ice albedos on TP from observations are less than 0.12, and the clear blue ice albedo is only 0.075, much lower than those in previous studies. Even that of ice covered with snow patches is only 0.212. MOD10A1 albedo product has the best agreement with observations, followed by those of MYD10A1. MCD43A3 product is consistently higher than the observations. Due to an error of snow flag and inconsistent time windows in MCD43A2 and MCD43A3, at certain times, the albedo of the lake ice without snow is even higher than that covered with snow. When the solar zenith angle is not considered, there is no significant correlation between the albedo and the ice surface temperature. None of the existing ice-albedo parameterizations can reproduce well the observed relationship of the ice albedo and surface temperature.