



Surface temperature pattern analysis of Lake Geneva 1991-2004 using AVHRR data

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Surface water temperature is one of the most important physical parameters of a Lake. It reflects meteorological and climate forcing more intensive than any other physical parameter. For Lake Geneva, as for most lakes, few consistent in-situ measurements are available making the mapping of spatial distribution of the Lake surface water temperature (LSWT) difficult.

LSWT retrieved from co-located infrared radiances as observed by the AVHRR on-board the operational NOAA satellites allow a consistent and detailed mapping of a continental water body. In this study, LSWT was retrieved for cloud free days in the period ranging from 1991 -2004 for Lake Geneva.

The LSWT maps have been aggregated into 15 days means to account for missing pixels due to cloud contamination and analyzed using principal component analysis (PCA) in S-mode. The results reveal that the most dominant pattern of spatial variability to be a monopole, alternating between anomalously cool and warm conditions, notably the summer of 2003 had the highest score on this principle component. The successive principal components reveal other interesting patterns of variability consistent important LSWT processes. The results are compared to available in-situ water and air temperature measurements.