The 36th International Symposium on Remote Sensing of Environment,
11 – 15 May 2015, Berlin, Germany, ISRSE36-429

REMOTE SENSING OF INLAND WATER SURFACE TEMPERATURES: POSSIBILITIES AND APPLICATIONS

K. Fricke [a]*, B. Baschek [a]

[a] Federal Institute of Hydrology (BfG), Department Geo-Information and Remote Sensing, GRDC,
Am Mainzer Tor 1, 56068 Koblenz, Germany – fricke@bafg.de, baschek@bafg.de

THEME: Water Cycle

KEY WORDS: Water Temperature, Thermal Infrared, Airborne Remote Sensing, Satellite Remote Sensing, Surface Water Temperature

ABSTRACT:

Water temperature is an important water quality parameter. It is routinely measured by water quality measurement stations or at gauging stations and used to assess the condition of the aquatic ecosystem. The amount of in situ measurements is limited due to the cost and the restricted accessibility of some research areas, so large water areas and local processes may remain unobserved. In situ measurements can be expanded and interpolated with remote sensing in the thermal infrared (TIR) wavelength region. In this presentation, we will compare the advantages and disadvantages of different platform/sensor combinations. Then the temperature accuracy of the resulting TIR datasets with varying resolutions is evaluated by comparing them to in situ measurements. For three research areas in Germany, possible applications of TIR data are presented. For the Rhine River, longitudinal profiles were extracted from the remote sensing data and the representativeness of measurement stations and the ability to detect inflows and their effects on the mean river water temperature were analysed. At the Lower Elbe, TIR water temperatures serve as a tracer of temperature changes, diffusion and mixing processes due to the tide. In the Berlin river network, the seasonal distribution of water temperature was derived from TIR datasets. Further TIR applications such as dike and ice monitoring will be addressed in the future.

*Corresponding author.