

Retrieving and evaluating water quality parameters of inland waters with Landsat 8 and Sentinel 2

K. Stelzer^a, C. Brockmann^a, R. Doerffer^a, A. Ruescas^a, D. Odermatt^b

^a Brockmann Consult GmbH, Geesthacht, Germany – kerstin.stelzer@brockmann-consult.de

^b Odermatt und Brockmann, Switzerland

THEME: Water Cycle

KEY WORDS: Inland Water, Monitoring, water quality, Landsat, Sentinel

ABSTRACT:

Lake water quality is fundamental for species living in and near the water. It is subject to increasing environmental pressure, including eutrophication, climate change, anthropogenic consumption and pollution, or structural interventions. Although remote sensing of lake water optics and water quality products goes back into the 1970's, only the development of the past 10 years in water optics and water remote sensing has raised inland water optical remote sensing to a recognisable level. Specifically the availability of Landsat 8 data, which are of excellent radiometric quality, and the preparational work for Sentinel 2, which is expected to be even superior to Landsat 8 in many respect, have led to significant progress. Compared to coastal waters, inland waters have a much higher variability in their specific optical properties and the concentration ranges, leading to a variability in its surface reflectance spectra which exceeds those of coastal waters by magnitudes. The CoastColour neural network based inversion technique for MERIS has been successfully applied also to large inland waters, and the method has now been transferred to Landsat 8 and to provide atmospherically corrected water leaving reflectance spectra and scattering based water properties, such as backscatter, turbidity or TSM concentration. Retrieval of absorption based properties, e.g. Chlorophyll concentration, currently seems too challenging. Optical water type classification is a suitable tool to distinguish waters dominated by absorption or scattering and guide further processing. Spatial aggregation methods have been developed in order to provide required input to reporting to the EU WFD and to perform lake-wise time series analysis to support scientific analysis of phenological cycle, reveal trends and derive higher indicators of lake conditions.