

## EnviMetal – Vegetation stress as bioindicator for soil contamination in floodplains

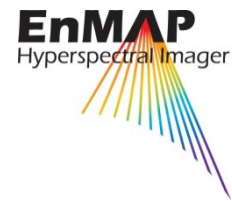
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### Abstract:

The high spectral and temporal resolution of the German earth monitoring satellite EnMAP enables new application fields and a significant improvement of global monitoring tasks. Beside the quantitative derivation of surface parameters the recordings of the sensor contain important information about the state and change of ecosystems. Regarding to this, there was an evident increase in terms of the frequency and intensity of flood events in large parts of the world. As land use in many flood areas is often dominated by abandoned mines, intensive agriculture and urban structures, entrained sediment loads by floods are heavily polluted and can lead to heavy metal accumulation in floodplains.

The aim of the EnviMetal project is the planar acquisition and assessment of the current state of heavy metal contamination of the study site Elbe (TERENO) with hyperspectral remote sensing data. The ecotoxicological effects of heavy metals are derived directly and indirectly from the spectral soil and plant properties. Semi-automatic algorithms are used for parametrization and separation of stress features in floodplain vegetation.

The focus of the project is the development of hyperspectral indices to apply the EnMAP-data as bioindicator for detection and identification of plant stress. The use of established and newly generated indices will be tested and other methods, like the determination of the Red-Edge position or spectral reflectance normalization techniques, are taken into account. As contaminant accumulation highly depends on the floodplain morphology, an analysis of the surface shape is made by coupling of optical remote sensing data with digital terrain models. Even more pedological and plant relevant control variables are derived by synergetic use of multisensoral data. Hyperspectral HySpex- and AISA-data is recorded and provided by the project partners GFZ and UFZ. First, the transferability from spectrometer point measurements to the AISA-scenes for the quantitative detection and comprehensive analysis of disturbed respectively contaminated floodplains is checked. Then the transfer of the results to simulated EnMAP-data is tested. Finally, comprehensive maps are generated which are showing the heavy-metal pollution of floodplain areas of the Elbe and Mulde in Saxony-Anhalt.



### EnviMetal

**Duration:** 01.11.2014 – 31.12.2017

**EO Data Source:** EnMAP, Sentinel-2, AISA-DUAL, HySpex

**Support Program:** PhD Program for EnMAP utilization preparation

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<http://www.enmap.org/>

[http://www.geo.uni-](http://www.geo.uni-halle.de/geofern/projekte/envimetal/)

[halle.de/geofern/projekte/envimetal/](http://www.forschung-sachsen-an-halt.de/index.php3?option=projektanzeige&anzeigen=1&pid=18723&lang=0)

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