



Spatial estimation clay content and water content properties using remote sensing data: case of the Haouz plain (central Morocco)

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Clay content is an important parameter governing the hydrodynamics soil parameters and fundamental to address agricultural management and environmental development.

This study used the middle infrared index (MID-infrared) product of Landsat-8 Operational Land Images (OLI) to map clay content over bare soil based on topsoil samples taken from the Haouz plain (Central Morocco). Then clay content at 100 m grid spatial resolution was predicted over areas covered by green vegetation using the Ordinary Cokriging approach. The obtained clay content map were thereafter converted by means of suitable pedotransfer functions to map field capacity (θ_{fc}), wilting point (θ_{wp}) and total available water (TAW).

A correlation analysis showed that clay content was significantly correlated with MID infrared index. The Cokriging improves the map of clay content which records a reasonable accuracy ($R^2=0.70$, $RMSE=3.5\%$) compared to independent soil samples. The resulting maps of field capacity, wilting point and total available water were validated by in situ measures taken from experiment sites of the Haouz plain ($R^2 = 0.8$, $RMSE=0.0046 \text{ mm}^3/\text{mm}^3$).