ICG2022-620, updated on 08 Jun 2023
https://doi.org/10.5194/icg2022-620
10th International Conference on Geomorphology

Imaging spectroscopy in low relief landforms with airborne AHS images: an example in the Tagus Basin, Central Spain

Eduardo García-Meléndez[1], Montserrat Ferrer-Julià[1], Elena Colmenero-Hidalgo[1], Antonio Espín de Gea[2], Mónica Reyes[2], Francisca Carreño[2], Juncal A. Cruz[3], Arturo Báscones[1], Sara Alcalde-Aparicio[1], and Inés Pereira[1]

[1]Research Group Environmental Geology, Quaternary and Geodiversity (QGEO), Universidad de León (Spain)
[2]Centro Tecnológico del Mármol, Piedra y Materiales. Cehegín (Spain)
[3]Facultad de Ciencias Geológicas, Universidad Complutense de Madrid (Spain)

High spatial resolution data recorded by the AHS (*Airborne Hyperspectral Scanner*) imaging system is evaluated for mapping the mineral composition of low relief landforms. The study area is located in the Cenozoic Tagus sedimentary basin (Central Iberian Peninsula) in geological units made of clay (smectites), evaporitic (gyspsum, anhydrite) and carbonate rocks (limestones and dolostones). The study is based on the spectral response of key minerals such as calcite, gypsum and both Mg and Al-bearing clays in order to map their presence in the flat and gently sloping surfaces of the area located between the Tagus, Tajuña and Jarama rivers. Two mapping techniques were used: image band ratios to enhance diagnostic mineral absorption features and the SAM (*Spectral Angle Mapper*) algorithm. Both methods show a good discrimination of the above referred minerals, being the best mapped gypsum. For the validation of the results, spectroscopic field and laboratory measurements were used together with the geological map of the study area and conventional aerial photointerpretation, providing the spatial distribution of Landforms mapping units and their differentiated mineral composition grouped in three main domains.

Acknowledgements: this research is supported by FEDER/Spanish Ministry of Science and Innovation-*Agencia Estatal de Investigación*) research project ISGEOMIN-ESP2017-89045-R and HYPOPROCKS (PDC2021-121352-100) by MCIN/AEI/10.13039/501100011033 and the European Union "NextGenerationEU"/PRTR