

## A COMPARATIVE CASE OF STUDY OF IMAGE SHARPENING

V. Rodríguez Galiano<sup>\*a</sup> E. Pardo-Igúzquiza<sup>a</sup> M. Chica-Olmo<sup>a</sup> M. García-Soldado<sup>a</sup> J. Rigol-Sánchez<sup>b</sup> M. Chica-Rivas<sup>c</sup>

<sup>b</sup> Universidad de Jaén, Departamento de Geología, Campus Las Lagunillas s.n., 23071, Jaén, Spain

<sup>a</sup> Universidad de Granada, Geodinamica, Av. Fuentenueva s/n, 18071, Granada, Spain

<sup>c</sup> Universidad de Granada, Departamento de Análisis Matemático, Facultad de Ciencias, Av. Fuentenueva s/n, 18071, Granada, Spain

Technical Commission VII Symposium 2010

**KEY WORDS:** Statistics, Fusion, Algorithms, Landsat, Spatial

### ABSTRACT:

In this paper we present a comparative case of study of different methodologies for image sharpening. The evaluated methodologies are classic procedures such as Brovey (BR), Intensity Hue Saturation (FIHS), and Principal Component Analysis (PCA); two procedures based on wavelet transforms: Wavelet à Trous (WAT) and MultiDirection MultiResolution (MDMR); and one method of a geostatistical nature, Downscaling Cokriging (DCK). The comparison of the fused images is based on the quantitative evaluation of their spatial and spectral characteristics by calculating statistical indexes and parameters to measure the quality and coherence of the resulting images. Synthesis of the obtained results shows that the algorithm fusions based on wavelet and DCK yielded better results than did the classical algorithms. Particularly, the DCK geostatistical method does not introduce artefacts in the estimation of the digital levels corresponding with the source multispectral image and, in this sense, can be considered the most coherent method. The MDMR method produces the merged images with the highest spatial quality.

**TOPIC:** Data fusion and data assimilation

**ALTERNATIVE TOPIC:** Data fusion and data assimilation