

# A new method for geomorphological studies and land-cover classification using Machine Learning techniques

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The processing of aerial high-resolution images is key for territorial mapping and change detection analysis in hydro-geomorphological high-risk areas. A new method has been developed in the context of "CLOSE (Close to the Earth)" project, resulting in a work

flow based on open source MicMac photogrammetric suite and on High-Performance Computing. The workflow allowed to process a sequence of more than 1000 drone images captured along a reach belonging to the Basento River in Basilicata (Italy) during one single run.

The workflow optimisation aims to extract the orthophotomosaic, the point cloud and the Digital Surface Model (DSM) of selected areas. The high quality of the image details can be used for land-cover classification and extrapolating features useful to mitigate the hydro-geomorphological hazard, through machine learning models trained with satellite public data. Several Convolutional Neural Networks have been tested using progressively more

complex layer sequences, data augmentation and callback techniques for training procedures. The results are given in terms of model accuracy and loss.

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