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Clime: analyzing and producing climate data in GIS environment

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In the last years, Impacts on Soil and Coasts Division (ISC) of CMCC (Euro-Mediterranean Center on Climate Change) had several collaboration experiences with impact communities, including IS-ENES (FP7-INF) and SafeLand (FP7-ENV) projects, which involved a study of landslide risk in Europe, and is currently active in GEMINA (FIRB) and ORIENTGATE (SEE Transnational Cooperation Programme) research projects. As a result, it has brought research activities about different impact of climate changes as flood and landslide hazards, based on climate simulation obtained from the high resolution regional climate models COSMO CLM, developed at CMCC as member of the consortium CLM Assembly. ISC-Capua also collaborates with local institutions interested in atmospherical climate change and also of their impacts on the soil, such as river basin authorities in the Campania region, ARPA Emilia Romagna and ARPA Calabria. Impact models (e.g. hydraulic or stability models) are usually developed in a GIS environment, since they need an accurate territory description, so Clime has been designed to bridge the usually existing gap between climate data - both observed and simulated - gathered from different sources, and impact communities.
The main goal of Clime, special purpose Geographic Information System (GIS) software integrated in ESRI ArcGIS Desktop 10, is to easily evaluate multiple climate features and study climate changes over specific geographical domains with their related effects on environment, including impacts on soil. Developed as an add-in tool, this software has been conceived for research activities of ISC Division in order to provide a substantial contribution during post-processing and validation phase. Therefore, it is possible to analyze and compare multiple datasets (observations, climate simulations, etc.) through processes involving statistical functions, percentiles, trends test and evaluation of extreme events with a flexible system of temporal and spatial filtering, and to represent results as maps, temporal and statistic plots (time series, seasonal cycles, PDFs, scatter plots, Taylor diagrams) or Excel tables; in addition, it features bias correction techniques for climate model results. Summarizing, Clime is able to provide users a simple and fast way to retrieve analysis over simulated climate data and observations within any geographical site of interest (provinces, regions, countries, etc.).