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Chiara Calligaris is researcher in Engineering Geology at University of Trieste, Faculty of Mathematics, Physics and Natural Sciences at the Department of Mathematics and Geosciences.

Born in Gorizia (Northern Italy), on November 8th, 1971, she graduated (November 18, 1999) in Geological Sciences at the University of Trieste with a thesis having as title: Studies on slope stability in the right side of Bombaso River. In 2005, she took her Ph.D. in “Geomatics and environmental information systems” at the University of Trieste with a thesis having as title: Multicriterial analysis created to realize a geostatical vulnerability map for the Friuli Venezia Giulia Region (NE Italy). Since the graduation, she worked as collaborator with the Geological Survey of the Friuli Venezia Giulia Region on a National Project called I.F.F.I. (Inventory of Landslides Phenomena in Italy). She also collaborated with the Basin Authority of Isonzo, Tagliamento, Livenza, Brenta e Bacchiglione Rivers to create the inventory of the geostatical events (landslides inventory). Responsible and/or collaborator in programs founded by Ministry of Education, Ministry of Foreign Affairs and C.N.R., she was involved in physical geography with particular reference to morphological evolution of slopes, engineering geology and hydrogeology.

Authors or co-authors of more than 33 published scientific papers or books or chapters. She currently has got, as preferential research lines, the applied geomorphology and hydrogeology with particular reference to landslides and systems of aquifers (in porous environment and karstic ones).

Among her multidisciplinary studies, she also carried on a deep investigation on debris flow phenomena analyzing the rheological part and creating scenario of event for the territorial planning. As results of these researches several communications in national and international conferences and publications were collected.

Landslides susceptibility map and future activities in the Central Karakoram National Park

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The preservation of the breathtaking beauty of the Central Karakoram National Park (CKNP) environment is now a must in order to pass on its ecosystem and cultural values for the benefit of present and future generations.

From a geological and structural point of view, the area in general can be defined as particularly weak due to the presence of important tectonic structures, planes on which the Himalayas and Karakoram ranges are set.

Crushing arcs and plates determine the presence, in these areas, of very active seismicity, which is considered as one of the main triggering factors in the occurrence of landslides. To be able to live in such a hostile environment it is necessary to learn to cohabit with extremely dangerous phenomena and to identify the safest

areas for the inhabitants to live. Even if the older generation historically know their territory, it is still important to approach these areas with innovative techniques and tools in order to indicate the

most suitable areas where to invest and to create new settlements or new safer routes for the tourists. This is the aim of the multidisciplinary project, named SEED (Social, Economic and Environmental Development in the CKNP Region), developed by the Ev-K2-CNR Committee having the purpose of catalyzing an integrated social, economic and environmental development, including the realization of the Central Karakorum National Park. The project operates in compliance with the priorities defined in the Implementation plan for the Agenda 21, developed at the World Summit of Sustainable Development in 2002 to achieve the reduction of poverty and support the sustainable development of mountain ecosystems. SEED is made up of several different projects, each one focused on a different theme, one of these is the landslide topic. In the framework of sustainable development, a landslide inventory of landslide or rock fall-prone areas should be useful to identify the areas where human settlements must be avoided and consequently it provides to the stakeholders an important updatable tool for future territorial planning, as required by the new management plan for the national park, where a zoning system for ecosystem conservation and promotion of tourism is recommended. To reach this goal, the area was analyzed through Digital Elevation Models (DEMs) derived from ASTER images (30 m grid cell size), which may be considered a powerful tool for visual and mathematical analysis of the topographic surface at a regional scale in barren territories. The morphological parameters characterizing the topographic surface are the main derived products from DEMs in remote areas where no topographic maps are available. These permit a geo-morphological mapping for a landslide, susceptibility/hazard assessment through the derivation of surface morphological parameters such as slope, aspect, curvature, slope profile and catchment areas. The landslide susceptibility study was analyzed with the application of the Analytical Hierarchy Process (AHP) based on the indexing of data layers and parameters. The method was tested in several different areas such as the Bagrot, Hispar, Biafo and the Chogo Lungma glacial areas, located inside the park. Through the analysis of the DEM, different slope morphologies were pointed out and the main landslides were identified (areas subjected to rock falls, single rock falls and debris flows).

Keywords:

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