Geophysical Research Abstracts
Vol. 12, EGU2010-2209-1, 2010
EGU General Assembly 2010


# ecological geological maps: GIS-based evaluation of the Geo-Ecological Quality Index (GEQUI) in Sicily (Central Mediterranean)

fabrizio nigro (1), giuseppe arisco (2), marcella perricone (1), pietro renda (3), and rocco favara (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Palermo, via U. La Malfa n. 153, 90146, Palermo, Italy (f.nigro@pa.ingv.it), (2) via G. Lanza di Scalea n. 414, 90100, Palermo, Italy, (3) Geologia e Geodesia dell'Università, via Archirafi n. 20, 90100, Palermo, Italy

The condition of landscapes and the ecological communities within them is strongly related to levels of human activity. As a consequence, determining status and trends in the pattern of human-dominated landscapes can be useful for understanding the overall conditions of geo-ecological resources.
Ecological geological maps are recent tools providing useful informations about a-biotic and biotic features worldwide. These maps represents a new generation of geological maps and depict the lithospheric components conditions on surface, where ecological dynamics (functions and properties) and human activities develop. Thus, these maps are too a fundamental political tool to plan the human activities management in relationship to the territorial/environmental patterns of a date region.
Different types of ecological geological maps can be develop regarding the: conditions (situations), zoning, prognosis and recommendations. The ecological geological conditions maps reflects the complex of parameters or individual characteristics of lithosphere, which characterized the opportunity of the influence of lithosphere components on the biota (man, fauna, flora, and ecosystem). The ecological geological zoning maps are foundamental basis for prognosis estimation and nature defenses measures. Estimation from the position of comfort and safety of human life and function of ecosystem is given on these maps. The ecological geological prognosis maps reflect the spatial-temporary prognoses of ecological geological conditions changing during the natural dynamic of natural surrounding and the main-during the economic mastering of territory and natural technical systems. Finally, the ecological geological recommendation maps are based on the ecological geological and social-economical informations, aiming the regulation of territory by the regulation of economic activities and the defense of bio- and socio-sphere extents.
Each of these maps may also be computed or in analytic or in synthetic way. The first, characterized or estimated, prognosticated one or several indexes of geological ecological conditions. In the second type of maps, the whole complex is reflected, which defined the modern or prognosticable ecological geological situation.
Regarding the ecological geological zoning maps, the contemporary state of ecological geological conditions may be evaluated by a range of parameters into classes of conditions and, on the basis of these informations, the estimation from the position of comfort and safety of human life and function of ecosystem is given.
Otherwise, the concept of geoecological land evaluation has become established in the study of landscape/environmental plannings in recent years. It requires different thematic data-sets, deriving from the natural-, social- and amenity-environmental resources analysis, that may be translate in environmental (vulnerability/quality) indexes.
There have been some attempts to develop integrated indices related to various aspects of the environment within the framework of sustainable development (e.g.: United Nations Commission on Sustainable Development, World Economic Forum, Advisory Board on Indicators of Sustainable Development of the International Institute for Sustainable Development, Living Planet Index established by the World Wide Fund for Nature, etc.).
So, the ecological geological maps represent the basic tool for the geoecological land evaluation policies and may be computed in terms of index-maps.
On these basis, a GIS application for assessing the ecological geological zoning is presented for Sicily (Central Mediterranean). The Geo-Ecological Quality Index (GEQUI) map was computed by considering a lot of variables. Ten variables (lithology, climate, landslide distribution, erosion rate, soil type, land cover, habitat, groundwater pollution, roads density and buildings density) generated from available data, were used in the model, in which

weighting values to each informative layer were assigned. An overlay analysis was carried out, allowing to classify the region into five classes: bad, poor, moderate, good and high.