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SMALL-SCALE GEOMORPHOLOGICAL MAPPING OF P.D.R. YEMEN: AN APPROACH TO LANDSCAPE EVALUATION (**)

Abstract: VILLWOCK G., *Small-scale geomorphological mapping of P.D.R. of Yemen: an approach to landscape evaluation.*

The first attempt at landscape evaluation of South Yemen utilises small-scale (1:1 million) geomorphological mapping, depicting macrorelief units 10 to 1000 km in size. Morphographic, lithological and morphostructural characteristics are identified. The mapping is based on remote sensing, field observations in selected areas, and data from geological maps. Evaluation of natural resources and geomorphological hazards is based on analysis of the relief in combination with climatic and soil data.

KEY WORDS: Geomorphological mapping, Small-scale maps, Remote sensing, P.D.R. Yemen.

Riassunto: VILLWOCK G., *Cartografia geomorfologica a piccola scala della Repubblica Popolare dello Yemen: un approccio all'esplorazione del territorio.*

In relazione a un primo rilevamento a piccola scala del territorio della Repubblica Popolare dello Yemen è stata eseguita una carta geomorfologica sintetica alla scala 1:1 milione, nella quale sono rappresentate le unità morfologiche con dimensioni lineari da 10 a 1000 Km (macroforme). Esse sono contraddistinte da caratteristici lineamenti fisiografici, litologici e morfostrutturali. La tecnica cartografica comprende l'uso di dati da telerilevamento, da carte geologiche e osservazioni originali di zone selezionate. La conoscenza delle condizioni del rilievo con l'aggiunta delle carte climatiche e pedologiche conduce ad un primo tentativo di valutazione delle risorse territoriali e dei rischi naturali della Repubblica Popolare dello Yemen.

TERMINI CHIAVE: Cartografia geomorfologica, Carta a piccola scala, Telerilevamento, P.D.R. Yemen.

In an area which is relatively poorly known, assessment of resources and identification of natural hazards can in the first instance begin with analysis of the relief. The methodology for such surveys has been pioneered by such organisations as the CSIRO (the land systems approach) and the ITC (geomorphological mapping in combination with remote sensing). In South Yemen, a developing country in the south-west of Arabia, mapping of the relief through remote sensing has enabled the first systematic assessment of resources and natural hazards to be made.

The relief and structure of South Yemen are the result of Tertiary and Quaternary morphogenesis under climatic

conditions that have varied from marginal tropical and semi-humid in the early Tertiary, to semi-arid or arid in the Neogene and Quaternary. The position of the area in relation to the Arabian Shield and the Arabian Shelf, and its proximity to the Gulf of Aden rift zone, have strongly conditioned the distribution of basement and sedimentary rocks, and also the tectonic style of the area.

Previous geomorphological investigations have been very limited. WISSMANN & LEIDLMAIR produced the first accounts of the structure and of the evolution of the relief. Subsequently, there were more detailed studies in the southern and coastal regions, but vast areas of the East and North remain largely unexplored.

METHODOLOGY OF SMALL-SCALE RELIEF ANALYSIS AND GEOMORPHOLOGICAL MAPPING

The research programme has attempted to compile a synthetic geomorphological map on scales from 1:1 million to 1:2 million, representing relief units from 10 to 1000 km in size. These units comprise heterogeneous associations of landforms whose recognition and characterisation are based on macroforms (mountains, plateaus, plains, etc.), mesoforms of subordinate scale (such as valleys, gorges, terraces, etc.) and on the main morphogenetic features. In devising a legend for the mapping, the relief units are first of all arranged in three main morphogenetic groups: forms of denudation, forms of accumulation and volcanic forms. Further subdivision of the first (denudational) category depends on relief amplitude, stage of dissection, lithology and structure. Forms of accumulation are subdivided according to their relief features and their origin (e.g. fluvial, alluvial fan or eolian deposits).

The following data sources are utilised:

- LANDSAT-1 imagery, with a ground resolution of about 80 m;
- aerial photography on scales from 1:50000 to 1:90000 for selected areas;
- outline geological maps (1:250000 to 1:1 million);
- topographic maps for selected areas; and
- field observations and mapping in selected areas.

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