DELINEATION AND DESCRIPTION OF THE GEOMORPHIC PROVINCES OF SOUTH AFRICA TO HELP FACILITATE THE CONSERVATION OF AQUATIC ECOSYSTEM BIODIVERSITY

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ABSTRACT

Freshwater ecosystem biodiversity conservation planning aims to ensure the long-term survival of aquatic native species and community types through the design and conservation of a portfolio of landscape-scale spatial units. The identification and selection of representative spatial units to meet this aim represents a challenge and various solutions (e.g. Ecoregions) have been offered. A joint South African initiative that seeks to develop a policy and planning tools for the systematic conservation planning of freshwater ecosystem biodiversity in South Africa has, as one objective (amongst others), to develop methods and data layers to represent both biodiversity pattern and ecosystem processes for South African aquatic biodiversity. One of the means of achieving this objective is the development of physical signatures as surrogates for biodiversity pattern. The development of these signatures is based on a theoretical framework for an interdisciplinary understanding of rivers as ecosystems. Application of the framework requires a detailed description of relevant levels of organization that characterise different subsystem hierarchies (e.g. geomorphology, hydrology and ecology) of the river ecosystem. For the geomorphological hierarchy, the highest level of organization is represented by the geomorphic province, which can be defined as homogenous areas of similar landforms that reflect comparable erosional, climatic and tectonic forces and impose broad constraints on lower levels of organization. Utilising previously defined provinces, recent work on the geological and geomorphological evolution of southern African fluvial systems, DEM-derived data and statistical techniques, 34 geomorphic provinces and 9 sub-provinces were delineated for South Africa. These provinces represent the initial coarse filter for defining physical signatures as surrogates for freshwater biodiversity, and can be used to help identify and select representative spatial units that conserve the diversity of communities and ecological systems.

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