

## A NEW GLOBAL GEOMORPHOLOGY?

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Geomorphology is entering a new era of discovery and scientific excitement centered on expanding scales of concern in both time and space. The catalysts for this development include technological advances in global remote sensing systems, mathematical modeling, and the dating of geomorphic surfaces and processes. Even more important are new scientific questions centered on comparative planetary geomorphology, the interaction of tectonism with landscapes, the dynamics of late Cenozoic climatic changes, the influence of cataclysmic processes, the recognition of extremely ancient landforms, and the history of the world's hydrologic systems. These questions all involve feedback relationships with allied sciences that have recently yielded profound developments. Examples include climatology (climatic modeling); tectonics (plate tectonic theory); geophysics (high-resolution geodetic and gravity surveys, seismic stratigraphy); sedimentology (sedimentary basin analysis); hydrology (hydroclimatic modeling, systems analysis); geochemistry (isotopic indicators of environmental change, geochronological techniques); pedology (documentation of chrono-functions); oceanography (detailed mapping of the sea floor); and planetology (discovery of new landscapes on other planets). The intellectual feedback from these associations can generate profound tests of existing geomorphic theory. For example, what are the implications of ancient channel and valley forms on Mars for the early climatic history of that planet? Are regional rates of long-term degradation consistent with sediment accumulation in basins? What were global hydrologic conditions associated with full-glacial climates? What have been the magnitude and frequency of various cataclysmic geomorphic processes through time? Can the ancient terrains extant on the terrestrial planets elucidate the early Precambrian history of Earth? Finally, the most significant scientific questions in applied geomorphology also have a global or regional context. Relevant concerns include the following: (1) accelerated erosion induced by deforestation, (2) the paleogeomorphology of continental margins (the major frontier of petroleum exploration), (3) the hydro-geomorphic consequences of a Carbon Dioxide warming, (4) desertification, and (5) urban landscape metamorphosis. The emergence of a "New Global Geomorphology" will require increased work by large interdisciplinary research teams, greater international cooperation, and an expanded philosophical basis for the science of terrestrial planetary surfaces.