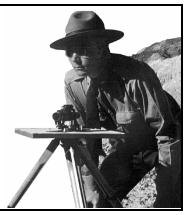
GEOLOGIC RESOURCE MONITORING PARAMETERS

Desert Biotic Crusts and Pavements



Brief Description: The appearance or disappearance of thin (mm to cm) surface crusts in playas and depressions in arid and semi-arid regions may indicate changes in aridity. The formation of persistent deep, polygonal cracks in the mud and silt floors of closed basins and depressions may indicate the onset of aridification or severe drought. Surfaces may contain other desiccation features such as sedimentary dikes, evaporite deposits (especially gypsum and halite), adhesion ripples and large salt polygons.

Significance: Desert surface crusts are important because they protect the underlying fine material from wind erosion.

Environment where Applicable: Arid to semi-arid terrains

Types Of Monitoring Sites: Playas and sabkhas in arid regions

Method Of Measurement: Field measurements of feature size, depth and extent, supplemented by ground surveys, air photos, and satellite images.

Frequency of Measurement: Fissures: 1-50 years. Crusts: 5-10 years

Limitations of Data and Monitoring: Surface features may not be preserved.

Possible Thresholds: NA

Key References:

Dunbar, R.B. & J.E. Cole 1993. Coral records of ocean-atmosphere variability. Report from the Workshop on Coral Paleoclimate Reconstruction, NOAA Climate and Global Change Program, La Parguera, Puerto Rico, Nov. 5-8, 1992.

Pernetta, J.C. (ed) 1993. Monitoring coral reefs for global change. Cambridge, International Union for the Conservation of Nature.

Shen, G. 1996. Rapid change in the tropical ocean and the use of corals as monitoring systems. In Berger, A.R. & W. J. Iams (eds). Geoindicators: Assessing rapid environmental changes in earth systems:141-146. Rotterdam: A.A. Balkema.

Related Environmental And Geological Issues: Changes in quality of shallow groundwater.

Overall Assessment: Surface crusts and fissures in deserts are good indicators of rapid changes in precipitation and temperature

Source: This summary of monitoring parameters has been adapted from the Geoindicator Checklist developed by the International Union of Geological Sciences through its Commission on Geological Sciences for Environmental Planning. Geoindicators include 27 earth system processes and phenomena that are liable to change in less than a century in magnitude, direction, or rate to an extent that may be significant for environmental sustainability and ecological health. Geoindicators were developed as tools to assist in integrated assessments of natural environments and ecosystems, as well as for state-of-the-environment reporting. Some general references useful for many geoindicators are listed here:

Berger, A.R. & W.J.Iams (eds.) 1996. Geoindicators: assessing rapid environmental change in earth systems. Rotterdam: Balkema. The scientific and policy background to geoindicators, including the first formal publication of the geoindicator checklist.

Goudie, A. 1990. Geomorphological techniques. Second Edition. London: Allen & Unwin. A comprehensive review of techniques that have been employed in studies of drainage basins, rivers, hillslopes, glaciers and other landforms.

Gregory, K.J. & D.E.Walling (eds) 1987. Human activity and environmental processes. New York: John Wiley. Precipitation; hydrological, coastal and ocean processes; lacustrine systems; slopes and weathering; river channels; permafrost; land subsidence; soil profiles, erosion and conservation; impacts on vegetation and animals; desertification.

Nuhfer, E.B., R.J.Proctor & P.H.Moser 1993. The citizens' guide to geologic hazards. American Institute for Professional Geologists (7828 Vance Drive, Ste 103, Arvada CO 80003, USA). A very useful summary of a wide range of natural hazards.