

Global Military Operating Environments (GMOE) Phase I: Linking Natural Environments, International Security, and Military Operations

The goal was to gain a better understanding of soil and terrain across all four major environmental systems: Desert, Cold Region, Tropic and Temperate. The U.S. Army's existing frameworks and approaches to characterize the natural environment worldwide were outdated (most circa 1955–80), oversimplified, and lacked integration of current scientific knowledge of critical processes that occur in global environments. Current technology that can extensively characterize natural environments was underutilized. We presented a science-based analysis of major global terrain environments to identify the environmental variables most likely to adversely impact military testing and tactical operations. Our results established a military environments reference database that will collate soil and terrain data and related literature to increase availability of global terrain data to the testing and training community, reported in 2015. We established Master Environmental Reference Sites (MERS) in areas that represent terrain conditions critical for military operations and testing. Our results included initiating data analysis at these new MERS, analyzing soil and assessing techniques that support IED detection, and determining terrain analogs for areas of current and future strategic interest based on terrain characterization.

Summary of Project Details: Our approach was to conduct analyses in four areas: 1) analyze MERS sites for soil characterization, 2) analyze physical changes to shallowly disturbed soils, 3) conduct microtopographic mapping for IED detection using LiDAR, and 4) characterize terrain conditions on six test courses at key military installations. Our approach was in support of focusing on soil impacts on the detection and defeat of IED's and on advancing knowledge of critical soil and terrain variables that directly supports testing of military equipment.

Management Implications: Our characterization of soil analogs that represent global operating environments supports the scientific assessment of the GMOEs that were being conducted at the time of this report. We also provided useful information that supports the Developmental Test Command and YPG objectives for the Range Model and Simulator, as well as established baseline terrain information, and application of remote sensing technologies for Warfighter and Chameleon.

This project also produced data and information that support three primary U.S. Army Research Office research area priorities. These are understanding the behavior of the land surface and near-surface environment along with the natural processes within these domains, modeling these environments, and increasing knowledge of these areas (properties and phenomenology) which is critical to support military operations.

