

Land Surface Heat Emissivity in Yellowstone National Park



Topic: Environmental management

Problem Statement: In Yellowstone National Park, surface temperatures must be understood in order to keep visitors safe as well as to identify areas into which increased subsurface geothermal activity may be migrating.

Level: Beginner to Intermediate

Software: ENVI, ArcGIS

Description: With over 10,000 individual features, such as hot springs, hot pools, mud pots, fumaroles and geysers, Yellowstone National Park attracts millions of visitors each year. The park is located over a “hot spot,” deep-seated magma brought close to the surface through a conduit known as a magma plume. The magma then pools in an area near the surface in a magma chamber. This Learning Unit examines the driving force behind this concentration of hydrothermal activity. It exposes students to geospatial techniques through the use of GIS and remote sensing and develops their skills in spatial analysis of a geophysical phenomenon. It focuses on a real-world situation which park administrators, USGS scientists, and research institutions address on a regular basis.

Key words: Heat emissivity, geothermal, hydrothermal, volcanism, plate tectonics, ArcGIS, remote sensing, ENVI, Landsat, thermal band, radiance, atmospheric correction, national parks

