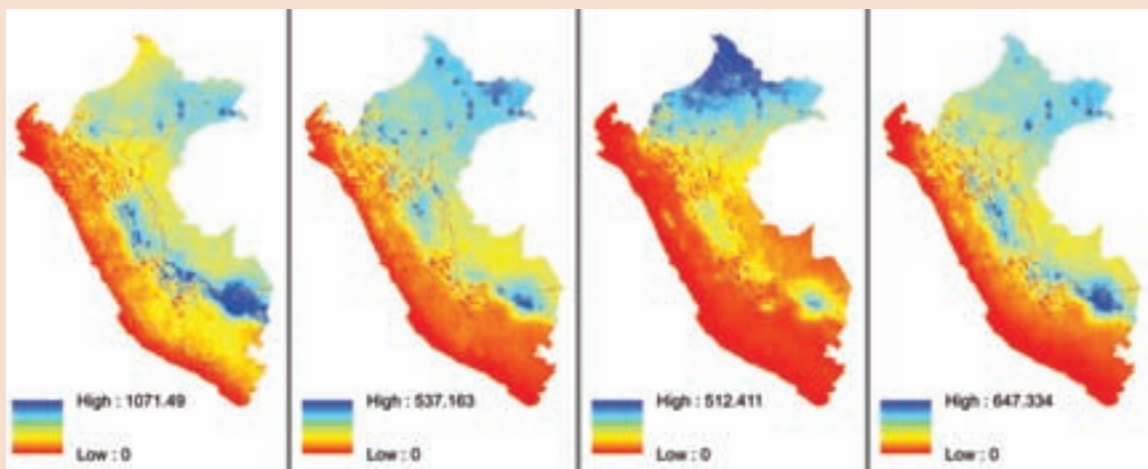




Satellite-enabled hydrologic assessments

Hydrologic assessments made easier – and more accurate – with satellite data

Quarterly precipitation patterns in Peru derived from the Tropical Rainfall Mapping Mission (TRMM) satellite. Countries like Peru with a variety of climates and precipitation patterns can benefit greatly from the new technology



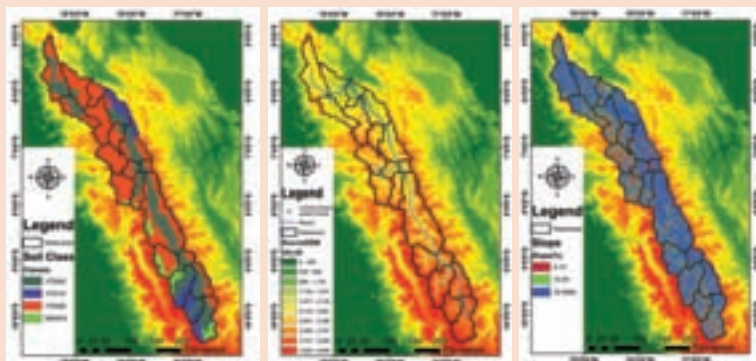
Every mine needs water and because many are in remote areas, accurately assessing the mine's water resources is often extremely difficult. MWH Global has developed a tool that uses satellite data to estimate water availability and hydrologic impacts in

extremely remote areas for mining and hydropower projects and operations.

Pairing the data with a process-based hydrological model has resulted in hydrologic assessments that have been accepted and approved by regulators. Other advantages include:

- easy access to hydrologic information with up to 17 years of statistically representative precipitation data – meaning the data are routinely accepted by financial and funding institutions;
- assessments are completed in a few weeks, rather than months or years;
- water volume estimates can be updated easily and used to support decisions at every stage of the mine / project life; and
- the majority of the data collection and assessment can be done from a desktop, decreasing risks and field costs while allowing the project to move forward discretely.

“Accurately assessing the mine's water resources is often extremely difficult”



Satellites provide data on soil characteristics (clay, lime and sand proportions) and further refine our understanding of infiltration and evaporation (mm/hr) rates

Drainage is based on the terrain. Satellites can provide topographic data at 30m resolution. This 54,000km² basin has elevations ranging from 38m above sea level to 6,600m

Mapping physical characteristics of the watershed permits accurate modelling of a site's water availability. This figure shows the slopes in a watershed

The MWH tools and methodologies have been used for hydrologic assessments at mines in wet (~ 2,000mm/year precipitation) and dry areas (~ 450mm/year) with excellent results.

The tools can also be used to evaluate the hydrology of large (12,000km² to 54,000km²) and physically diverse basins. ♥