

Earthquake science takes to the air to look for faults

Copter flights aim to boost knowledge of aquifer, geothermal energy and seismic hazards

Charles Q. Choi, OurAmazingPlanet.com, 11-1-11

Call it earthquake science from the air: A helicopter is swooping low over the ground in Colorado, scanning for ancient faults.

Researchers hope such flights, being conducted for four to six weeks, will enhance their knowledge about a vital aquifer, the potential for geothermal energy, and the likelihood of seismic hazards.

The San Luis Valley, in south-central Colorado, has an ancient history of seismic activity. It remains a mystery as to where the area's faults are buried and whether they act as a plumbing system for groundwater and geothermal hot springs.

To find out more, a helicopter under contract to the U.S. Geological Survey began scanning for hidden faults in the valley Oct. 24.

"There's a lot of mystery about what's down there, and we're getting information back about it," researcher Tien Grauch, a USGS geophysicist, told OurAmazingPlanet.

The copter has special equipment and is flying back and forth about 320 feet (100 meters) above the ground to measure variations in the Earth's magnetic field in the northern San Luis Valley. "The instrument looks like a big stinger in front of the helicopter," Grauch said.

The aim is to search for magnetic anomalies linked with faults below the Earth's surface. "This method can see down to kilometers deep," Grauch said.

In another assignment earlier in October, the helicopter carried a large, electrically charged hoop of metal about 100 feet (30 meters) over the ground to map the area's sand and clay layers. The device projected an electrical field downward and measured the response from the ground below, which indicated the dominant material, as sand is more electrically resistive than clay.

"The clay layers have a large effect on the groundwater here," Grauch explained. Specifically, they confine groundwater coming from the neighboring mountains, pressurizing it within an aquifer. Due to concerns that wells are pumping water from this aquifer faster than nature is replenishing it, the state is strictly regulating how much water can be drawn from the aquifer. Improving the knowledge of where the clay lies could thus help manage this vital water, Grauch said.

After this assignment is completed, a third survey will start at the end of November to look for gravitational variations in the area. The strength of Earth's gravitational field on any point of the planet's surface varies on the density of the underlying rock.

"This is another way to look at faults, but this method looks at very big faults," Grauch said. "We're employing three different geophysical methods to look at different properties of the Earth to understand what the geology here is as best we can."