SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

Groundwater is a vital resource, together let's protect it.

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Airborne Geophysical Measurements

The Santa Cruz Mid-County Groundwater Agency (MGA) is a joint partnership among the County of Santa Cruz, Central Water District, Soquel Creek Water District, and the City of Santa Cruz to sustainably manage the Mid-County Groundwater Basin.

To determine the location of the saltwater/freshwater interface in the offshore groundwater aquifers, a key piece of information for groundwater management, we will be taking electromagnetic measurements using geophysical sensors that are housed in a large circular frame towed below a helicopter. The system uses an electric current that is pulsed through a transmitter wire, and the resulting electromagnetic fields are measured at the receiver allowing us to measure electrical properties of the underground materials below the wire. The helicopter slowly tows the sensors about 100-200 ft above the ground or ocean while taking measurements. Because the helicopter can cover more than 100 miles in a day, the Airborne Electromagnetics system is able to collect nearly continuous data over large areas and signals can potentially penetrate up to depths of 1,500 feet. The areas of interest are sketched on the figure below. The area follows the beach and ranges to a distance of 1 mile off the coast.

The same system was flown over Marina, Castroville and Moss Landing the week of May 15th to assess the Salinas Valley Groundwater Basin. A similar system was used recently in the Central Valley as part of a study by Stanford University in partnership with the Tulare Irrigation District, and in the San Joaquin Valley as part of a study between the USGS and State Water Resources Control Board.

Fact Sheet

Q: What is “Airborne Electromagnetics”?

A: Airborne electromagnetics (AEM) is a geophysical method originally developed for use in the mining industry to map ore bodies. In the past decade, the method has been increasingly used to map groundwater resources throughout the world. It works by measuring variations in the electrical conductivity of the ground. Electrical conductivity of rocks and soils is a property that depends on composition and water content.

Q: Why does the helicopter fly so low?

A: It flies at a low altitude because the instruments can sense the properties of the ground more accurately at a low altitude.

Q: How does it work?

A: The helicopter flies about 100 - 200 ft above the ground towing a large hoop that houses a transmitting wire that generates a weak electromagnetic field. This field

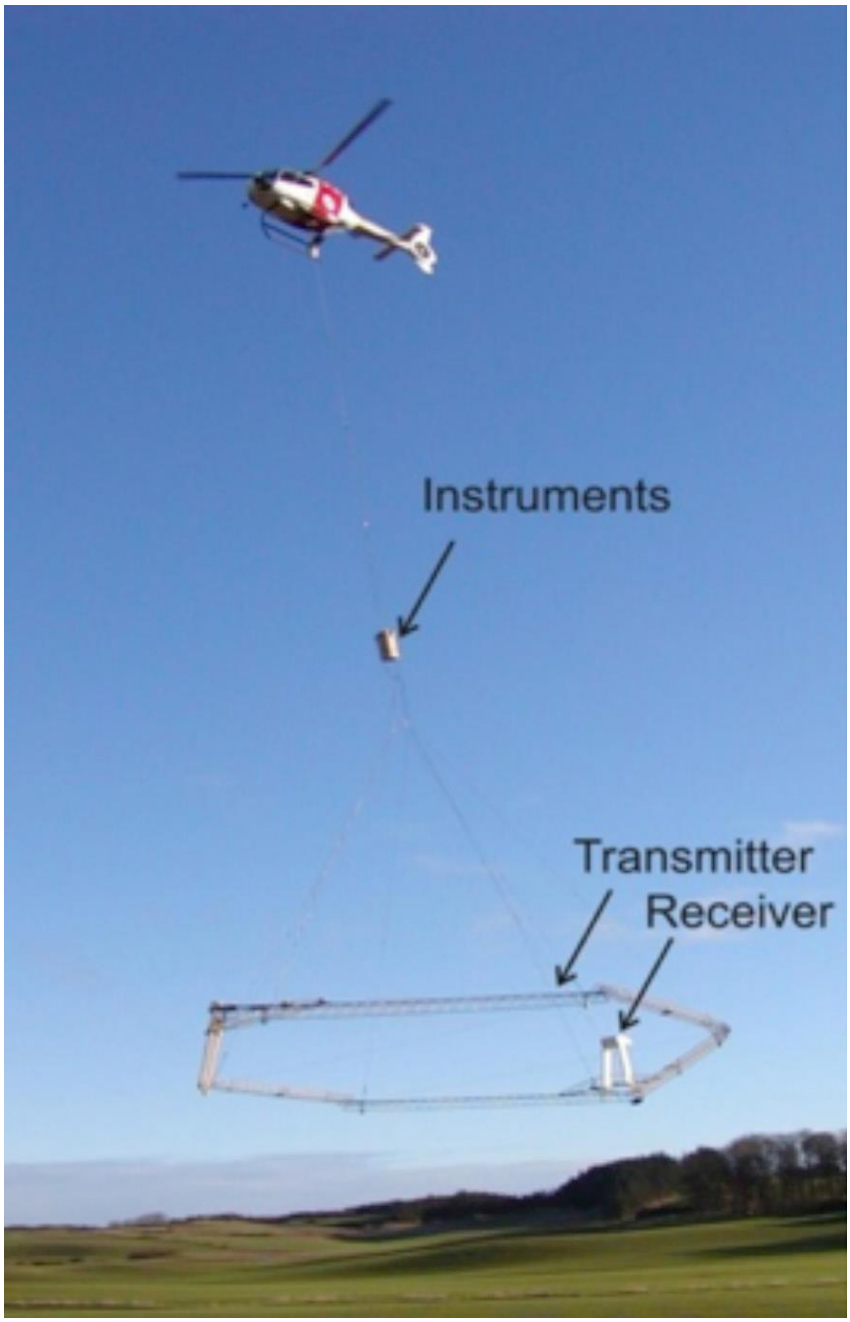
interacts with the ground, and the response from the ground is measured using a set receiver coils housed in the tower that you see on the back of the hoop. The helicopter flies back and forth over a series of regularly spaced lines, similar to mowing a really big lawn.

Q: Is the Technology Safe?

A: AEM has been safely used throughout the world. The electromagnetic signals generated by this system during surveying are weaker than the signals generated by other common man-made sources (for example, the power grid or an electric cook top). All operations must pass strict government aviation regulations, and the aircraft are flown by specialists who have many decades of experience collecting data in a wide variety of flying environments. The helicopter stays high enough that there is no rotor wash (wind) felt on the ground. It also keeps well above power lines and other obstacles. In accordance with FAA safety regulations, the flight paths do not cross over dwellings or urban areas.

Q: Will it Affect Electronics or Communications Equipment?

A: No, the electromagnetic field generated by the equipment is far too weak to interfere with electronic or communications equipment


Instruments
Transmitter
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