UC SANTA BARBARA
THE Current

July 21, 2004
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UCSB Manages Wildfire Hazard Center

Fire season is an extremely busy time for Dar Roberts, principal investigator of the Southern California Wildfire Hazard Center and professor of geography at the University of California, Santa Barbara.

The U.S. Forest Service uses the computer model based at UCSB that Roberts and his colleagues designed in cooperation with a consortium of universities, research organizations and the Los Angeles County Fire Department. The focus is the management of fire hazards at the urban-wildland interface to address a continuing regional problem that threatens life and property. In the near future, the Forest Service hopes to use a similar model to know when to fight a fire and when not to fight it.

Roberts explained that fire danger is based on three key factors: weather, terrain and fuels.

"The recent fire in Gaviota burned 5,000 acres in the first day," said Roberts. "But then there was high humidity and low wind. The fire would have been much bigger otherwise."

According to incident reports, 1,370 fire fighters were involved and the fire threatened 200 homes, two oil refineries, and the Reagan ranch. The fire fighting cost $6.4 million.

Roberts said the firestorm of last October, which saw blazes stretching from San Diego County north to Ventura County, occurred during a very hot and dry time. All that was needed was ignition.

Of the three key factors, weather conditions are dominant in the evolution of wildfires. The main weather parameters controlling the rapid and often unpredictable spread of wildfires are:

· the mean wind speed and direction

· wind gustiness

· air temperature and

· humidity near the surface

As might be expected, high temperatures and low humidity accompanied by strong and gusty winds are the most dangerous conditions. The real-time monitoring and forecast of weather conditions are key components in the integrated assessment of the Southern California Wildfire Hazard Center. The forecasts are generated by Charles Jones, associate researcher with UCSB's Institute for Computational Earth System Science (ICESS).

The flammability of plants can be assessed by satellite remote sensing which is playing an increasingly important role for mapping wildfire fuels and monitoring how they change seasonally. The spectral images provide information about the moisture level in the plants.

For chaparral type vegetation in general, the most important factors influencing flammability and fire behaviors are fuel moisture (the moisture content of living and dead plant material), fuel loading (the amount of plant material per unit area), and the ratio of dead fuel to living fuel. Fuel moisture is high in winter and spring, but gradually decreases during the hot, dry summer months.

NASA originally funded the project to purchase a supercomputer, implement wind models and develop remotely sensed measures of fuels. The Forest Service has now taken over funding, and, thanks to progress in computing technology, the modeling is now performed on what is called a "Beowolf" cluster system of personal computers based at UCSB. They run day and night.

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Southern California Wildfire Hazard Center

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