COASTAL ENGINEERING

Tsunami Threat Mapped along Southern California Coast

Although earthquakes in California are a constant threat, the possibility that a tsunami could wash more than 0.5 mi (0.8 km) inland after a large earthquake-induced landslide off the coast is gaining the attention of emergency management officials in the state.

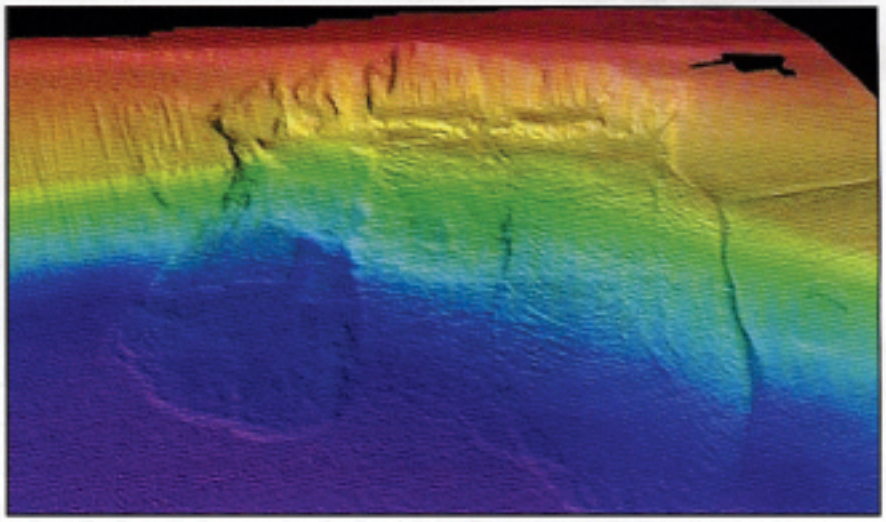
A study conducted by researchers at the University of Southern California shows the possibility of 50 ft (15 m) high waves striking the coast near Santa Barbara with little warning. The researchers are creating inundation maps for the state's Office of Emergency Services.

Tsunamis were once considered rare events, but many researchers believe that the large waves were occurring but were being overshadowed by other events, such as the earthquakes that cause them. "Tsunamis were simply being underreported," says Costas Synolakis, a professor of civil and environmental engineering at the University of Southern California's School of Engineering and one of the study's authors. Only one tsunami in the world was reported between 1964 and 1992, Synolakis says. Since 1992, however, 15 have been reported.

Much more work needs to be done to map potential slide areas off the coast, Synolakis says. In addition, engineers need to model the effects of tsunami wave forces on buildings and public infrastructure. Building codes also should be augmented to address potential tsunami events, he says.

Port facilities in particular are acutely susceptible to wave forces. Synolakis says that he and his colleagues are beginning to help ports develop design standards for ship moorings and offloading facilities that would be better equipped to survive a tsunami.

Tsunamis are drastically different from wind-generated waves, which travel along the ocean surface. The whole water column begins to move when a tsunami forms, which creates much more momentum and force when the wave reaches the coast. After the initial impact there is typically severe flooding.



A MASSIVE *offshore landslide more than 9 mi (14.5 km) long off the coast of southern California slid more than 1,500 ft (457 m) to the ocean bottom and could have caused a tsunami. Researchers have not determined when the slide might have occurred.*

Geologists with the Monterey Bay Aquarium Research Institute, in Moss Landing, California, mapped a 50 sq mi (130 km²) slump in the Santa Barbara Channel that could have produced a tsunami if the slide had occurred rapidly. The main slide area measures 9.1 mi (14.6 km) long by 6.5 mi (10.5 km) wide and extends from 295 to 1,870 ft (90 to 570 m) deep.

"The more we look at the offshore geology data, the more it looks possible that a tsunami could strike the coast in our lifetime," Synolakis says. ▼

—Brian Fortner

FUNDING

Big Dig Financial Plan Approved

The Federal Highway Administration and the U.S. Department of Transportation's inspector general have approved a $14-billion financial plan for the Central Artery/Tunnel project, or Big Dig, in Boston. The update includes a potential four-month extension for the project's completion, to April 2005, as a worst-case scenario. Federal aid for the project is limited to $8.5 billion.

The Big Dig has been severely criticized for alleged financial mismanagement in the past, which led to the resignation of James Kerasiotes, the chairman of the Massachusetts Turnpike Authority, last summer (see *Civil Engineering*, June 2000, page 20). The latest financial plan is the first of four submitted by the state to federal officials in 2000 to be approved. The next financial plan update is due in October 2001. ▼