

Big Waves Under the Pacific

Matthew Alford: "In my personal life I'm a surfer and a major enjoyer of the ocean."

Narrator: APL scientist Matthew Alford loves riding the big waves.

Matthew A.: "I grew up on the east coast and never surfed though I loved to go to the beach every day during the summer with my family. I didn't learn to surf until I went to work on my Ph.D. at Scripps in San Diego."

Narrator: Alford also studies ocean waves deep below the surface.

Matthew A.: "One of the big questions in physical oceanography today is where do these waves break and what causes them to break? It's important because when they break they take the cold water that is normally deep in the ocean and move it upwards. So what is happening is a big stirring and mixing of that water. And the way that the ocean transports that cold water and warm water around is very important for the response of the ocean and atmosphere climate system."

Narrator: Gravity waves are big.

Matthew A.: "They can go from the surface all the way down to the seafloor. It's not uncommon to have waves that are 100 m high, which is a 30-story building."

Narrator: And big, deep waves have a long reach.

Matthew A.: "Some of our work suggests that these waves are started in Hawaii and they go all the way across the Pacific, where they break on the continental slopes by Alaska, Washington, and Oregon."

Narrator: Satellites can spot deep waves from space — a ripple of only a few centimeters pulsing over vast areas of ocean, but on the surface, potentially hazardous.

Matthew A.: "There are certain places in the world, the South China Sea, for example, where these waves can get so large that they can affect submarine and even surface ship navigation."

Narrator: Waves that break on the shore and waves Matthew Alford catches on his surfboard only hint at the power and reach of the mammoth pulses of water deep below the surface. The mysteries of these deep waves are pursued by APL.

