

Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

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Crossing the Pacific Plate**

The big island of Hawaii was a welcome port call after nearly a week at sea and I led 30 students in my Geologic Hazards class up to Kilauea, one of the most active volcanoes on Earth, for a day of vulcanology.

Clouds of steam and sulfur gas are constantly emitted from the caldera, and several hundred feet below the top of the crater where we stood was a molten pool of red-hot lava. While some enthusiastic students really wanted to get a close up glimpse of boiling lava, National Park safety regulations don't allow visitors to get that close to the edge, just in case someone decided to step too close or an eruption began unexpectedly.

We spent a half a day in Honolulu on January 18 for refueling, and are now heading west-northwest for Japan. This is the longest leg of the entire voyage and one where we will go days without seeing much of anything but water—perhaps a ship, maybe a lost bird or two, but not much else. The closest land at this point is directly beneath us, about 11,000 feet straight down.

The Pacific Ocean covers about 1/3 of the entire surface of the Earth, and in fact, is larger than all of the land area combined. You can cross it in an airliner in half a day or so, which makes it seem a lot smaller. We are moving considerably slower, however, at about the speed of a brisk bike ride. It takes us a whole lot longer to cross 6400 miles of water, in our case about 17 days. Our vessel could go a lot faster but there are two other considerations regarding speed: we need to have enough days at sea to get the required lecture time in for classes, and fuel costs on a ship this size are very high, and as in a car, lower speeds mean better fuel efficiency.

Despite the immensity of the Pacific Ocean, and the ample opportunity for storms to create some uncomfortably large waves, so far we have been fortunate not to have experienced any really nasty weather. The largest swells have arrived as I'm writing this at about 15 feet.

It doesn't take much movement to make some people uncomfortable, even on a 600-foot ship. But for the most part, people are doing well; at least if the number of students lined up at mealtime and the amount of food on their plates is any indication of wellness.

Even though the ocean out here seems relatively calm, there are always swells or waves moving in different directions that cross our path. As a result, the ship, despite its size, is constantly pitching and rolling, which tends to make walking around or standing up to lecture a constant balancing act.

Most large cruise ships claim to have stabilizers, as does the ship we are traveling on. This tends to give passengers some false sense of comfort, even though these mysterious stabilizers are rarely if ever used because they increase drag and fuel consumption.

The color and surface appearance of the ocean as well as the cloud patterns are constantly changing throughout the day and from one day to the next. There are more shades of blue than I can describe and the water is quite clear, due in large part to a general lack of organic activity this far from land. There aren't a lot of nutrients or fertilizers 2000-3000 miles offshore to excite the phytoplankton or small floating plants, so there just isn't a great abundance of visible life.

We are also well south of where large concentrations of plastic have been reported and have seen virtually no debris in the water over our first 3000 or so miles. This is an encouraging sign and gives me hope for the ocean.

Being in the middle of 65 million square miles of Pacific Ocean, surrounded by vast volumes of seawater as far as we can see in every direction, makes it difficult to comprehend how the human population could possibly have any impact on the sea.

While our impacts are most visible and obvious in coastal waters, the seven billion of us that now occupy the planet are having measurable global ocean effects, whether it is changing the pH or acidity of the ocean, depleting many of the fish populations, or discarding plastic, we are the bad guys in this movie.