Video Transcript – Plate Tectonics (Volcanos with Liz)

Liz Cottrell: Hi. I'm Liz Cottrell, director of the Global Volcanism Program at the National Museum of Natural History. I'm standing here in the Geology, Gems, and Minerals Hall in front of the Earthquakes and Eruptions exhibit. We know that watching a single volcano erupt is totally awesome, but what can watching all volcanoes [00:00:30] erupt throughout the course of Earth history tell us about how the planet works? Let's take a look and find out.

Liz Cottrell: We're looking here at a map of the world. We see the familiar continents and oceans, but we don't see the tectonic plates or the plate boundaries. Rather than memorizing where they are, let's collect some data. I've started a video playing that's recording earthquakes and eruptions since 1960. Every time an earthquake happens, a dot appears, and every time a volcano erupts, a triangle appears.

Liz Cottrell: [1:02] One of the first things you'll notice is that earthquakes and eruptions are taking place all of the time. Way out in the middle of the ocean, we see all kinds of tiny white dots appearing. Earthquakes are happening 24/7 out in the middle of the ocean, deep below the water where you can't see it. What's causing these earthquakes? [1:30] Actually, it's volcanic eruptions. Volcanoes are erupting all the time on the sea floor, and they cause earthquakes to take place. So even though we can't see the volcanic eruptions, that's what's driving the earthquakes.

Liz Cottrell: What about in the middle of the United States? Or the East Coast? Nothing is happening. It doesn't look like that is a plate boundary. In fact, if we look around the entire edge of the Atlantic Ocean, we see hardly any activity. There are no plate boundaries. The only plate boundary in the Atlantic runs down the middle of the ocean, a divergent margin, the Mid-Atlantic Ridge. [2:00]

Liz Cottrell: Bang! We just heard a big cymbal crash in 1980 when Mount Saint Helens erupted in the western United States. That's a convergent margin, a subduction zone.

Liz Cottrell: One of the coolest things about this animation is that it shows you all the eruptions taking place all around the globe, all the time, that you never hear about. Let's watch this run for a minute and see if we see any patterns emerging. [2:29]

Liz Cottrell: WOW! [2:39] We're really starting to see some patterns emerge. All the white dots in the middle of the oceans tend to form along a line. Those are the divergent margins where the ocean plates are pulling apart and new crust is being created at the mid-ocean ridges.

Liz Cottrell: And now, along the edges of the continents all around the ocean, the Pacific Ocean Basin, [3:00] we see volcanoes erupting and more earthquakes. Those are the convergent margins where the plates are coming together and subduction is taking place. (This is) where dense, old ocean floor is subducting beneath the buoyant continents. All that dense, waterlogged plate going down is releasing its water and

causing volcanoes to erupt, and remember, volcanoes erupting is synonymous with earthquakes. [3:28] So we get lots of volcanoes and lots of earthquakes at these subduction margins. These concentrated zones of earthquake and eruption activity are defining our plate boundaries.

Liz Cottrell: [00:03:30] Well, we've arrived at 2011. We have some really striking patterns here. At this point, it's easy to define our plate boundaries. Just trace with your pencil where the earthquakes and eruptions take place. Let the data define the plate boundaries for you.

Liz Cottrell: The earthquakes and eruptions define the plate boundaries. [00:04:00] They occur in the middles of oceans and on the edges of continents. Remember, plate boundaries are located where earthquakes and eruptions are happening because that's where tectonic plates are pulling apart and coming together. [4:13]