tracey: [00:00](https://www.rev.com/transcript-editor/Edit?token=qtuJVuCIOXDPc_dcULsE7c2GLtolRiMGgBGhpRIRoztd4Ikq7CSavpRCnspm0kaXn2kV7v72e_48OZxf1OKBpsgPbXE&loadFrom=DocumentDeeplink&ts=0.61) Hello, and welcome to NC State's audio abstract. I'm your host, Tracey Peake. Volcanoes are fascinating and powerful drivers of change on earth. Arianna Soldati, a volcanologist and assistant professor of marine, earth and atmospheric sciences at NC State explains what they do, why they're important and how scientists try to keep people out of harm's way when they erupt. Welcome, Arianna.

Arianna: [00:26](https://www.rev.com/transcript-editor/Edit?token=omAyr-70IGRFhPV8Lhn1vVz3HX0_gRMlXwE6vaE3BOPYNZ7MtZfmch-HPTkwzbY7n-v7P7L1BR_IQiXWQI8PTWP6itg&loadFrom=DocumentDeeplink&ts=26.93) Hello, everyone. Thanks for having me on the podcast today.

tracey: [00:30](https://www.rev.com/transcript-editor/Edit?token=uuFxiY-A8Kwum2Mw9x8wEUNBdW3T7JmPSfCho2pMpe5wK9cSrfRPTZhgdMDDTYpgPFg4B5_S4pKy-AzkMvBR_4q5WuE&loadFrom=DocumentDeeplink&ts=30.39) I'm very happy you could be here because I love volcanoes. So this is going to be very exciting for me, but let's start with the basics about volcanoes. How do these form and why do they erupt? What's going on?

Arianna: [00:45](https://www.rev.com/transcript-editor/Edit?token=HX9iIRM2wtmcmC-0QXCP_dAUxSPlCkWYTrGpLx5mwH4Yey9Qa4dkOIbqX9FOzKT77yFXZ4ePtCtGSWQPPj4m4UN3eUg&loadFrom=DocumentDeeplink&ts=45.1) So let's start with what is a volcano, right? A volcano is a place on earth where some partially molten material makes it to the surface. Now on earth, this partially molten material is rock and we call it lava once it gets to the surface. And this happens in a bunch of different places on earth, but they are not random places. They are places where the plates that make up the crust come together or drift apart. And then there's also some volcanoes that happen right in the middle of a plate. And that is because material from the mantle, the middle layer of the earth, rises up and gets all the way through the surface. But the reason why we only have volcanoes in these special places and not everywhere is that contrary to maybe what we picture sometimes, the crust of the earth is not just floating on top of a magma ocean.

Arianna: [01:49](https://www.rev.com/transcript-editor/Edit?token=dLBqOinGOuC2DN37tzNZvGHUBcBufYIPuN68zdK9meZRo_ZXSP9fwaUE2gMjVPQplnlXE2DhtiMPUT2w5EYwGPsI6CA&loadFrom=DocumentDeeplink&ts=109.66) Everything inside the mantle is solid. There's only these specific places, typically where plates come together or drift apart where the mantle can actually melt. And once it has molten partially, it starts rising because it's less dense, it's too liquid. And so it makes its way to the surface, but it is sort of an obstacle run. It is actually really, really difficult for magma to get all the way to the surface and into a volcano and out on the surface of our planet where we can see the vast majority of magma that we produce never makes it quite that far. And it gets stuck at different places inside the crust of the earth and it solidifies over there and we never got to see it.

tracey: [02:43](https://www.rev.com/transcript-editor/Edit?token=EjsozGJTu_GEw33HvtMMXdTf8ifO_tcJEo4VX9DsK3LuvSlAgjQys7VyvWmPyQWRnvcN4IVRnZK4Y7li3L34jrg2g8A&loadFrom=DocumentDeeplink&ts=163.73) Well, well then, I guess I'm glad about that because otherwise there would just be magma everywhere all the time, if it were easy for it to get here, right?

Arianna: [02:51](https://www.rev.com/transcript-editor/Edit?token=yqKJy95Z_C1KA4lAtgoFsjewV039hOokDlugBOZcT5ucJcfArrVQZVoQkbBn23YpFLfUqOflClxZrQgeFiYdj7OOpxY&loadFrom=DocumentDeeplink&ts=171.75) That's right.

tracey: [02:53](https://www.rev.com/transcript-editor/Edit?token=PAP4SuA5S3_4hH4xrgbPyvt-7KIgUXxozCqB0SeIBhci2WfY5aR7Q3h61zeXggcizNzI1bWlTmFnlnwPU19muwHNG50&loadFrom=DocumentDeeplink&ts=173.34) So then if it's difficult for it to get to the surface, what actually would cause a volcano to sort of build up and erupt with lava?

Arianna: [03:04](https://www.rev.com/transcript-editor/Edit?token=H6e8Ih7TE2GMtSXr-jHv-1uOk6kJ13A3aK7zC3z6M550DKu_oezWd-l6JbNN79Jpl_giCA4yH7emE3L10hZ8XjJcMbU&loadFrom=DocumentDeeplink&ts=184.93) Sometimes there's just the right conditions. So for example, we can have magma that is not very dense and not very viscous. And so it can move through the crust swiftly, and then when it gets close enough to the surface, what happens is that the gas that is dissolved within it starts coming out and making bubbles and those bubbles make the magma much lighter and they push it all the way to the surface. And this is a very easy mechanism to visualize. It's the same thing that happens when you open a can or a bottle of soda or other fizzy drink, all the bubbles exsolve, come out and they propel the liquid to the surface. The same thing happens with magma.

tracey: [03:56](https://www.rev.com/transcript-editor/Edit?token=5xLXhTrpmiIjAEtCmGjuh44yOq9-wIRHp5QhmE6w8eRyGHoYJq-Z66ksniLB8LkzKkPdETatEmyyvie5CXw1juPUzlY&loadFrom=DocumentDeeplink&ts=236.58) A lot of people still live near these active volcanoes. Do we know how many active volcanoes that are on earth right now?

Arianna: [04:08](https://www.rev.com/transcript-editor/Edit?token=pWnm92sUATDzRJZ_S061Y1l-gBO7MbdLX8jXIKDsj1yuhpmO6jn2GyJGDPbYUvi3HXV5dXtr7RYipSQFt7_9raURvHY&loadFrom=DocumentDeeplink&ts=248.76) Yes. So we have about 500 volcanoes on earth that we consider to be active. And those are the volcanoes that not just the ones that are erupting right now, but also the ones that have had eruptions in the past 10,000 years or so, because volcanoes can have these very, very long repost periods where they're not erupting, but they still could be erupting potentially. So we still consider those active. And at any given time on earth, there's about 20 that are actually having an eruption.

tracey: [04:44](https://www.rev.com/transcript-editor/Edit?token=QCGan41YNwL90UT1_y2dNlp0R610Dm7HkfmVJI4zQX1j0ldzMlOTN1-gdAbHtAEkW8diD6vlhAvMUgkM5gKMGbcUd1I&loadFrom=DocumentDeeplink&ts=284.75) I know that you said you consider a volcano active if it's not erupted within 10,000 years, that's kind of a lot. How do volcanologists sort of determine when a volcano was last active and when it may be getting closer to an eruption?

Arianna: [05:08](https://www.rev.com/transcript-editor/Edit?token=zItRZhkRqQf4MIL07E9yuT77u70FhNcDC8UTEoohTQYmUhmTGQtyD1oKP_wPKl90UvcLuN2XVgkwVn9qWWfBSBXedzc&loadFrom=DocumentDeeplink&ts=308.75) Right. So for volcanoes that have erupted throughout human history in areas that are and were populated, we often have some kind of historic records, but that's all in the last few thousands of years of course. To go further back in time, we actually do radiometric dating with potassium and argon typically, for volcanic rocks and so we are able to determine when the last eruption occurred. And then we also look at other things such as their tectonic setting. So as long as the volcano is still right at the location where the plates are moving apart or coming together, there's probably the chance for new magma to form underneath it and make it to the surface, so that volcano would still be active. If instead enough time has gone by, the volcano ends up being at a location that it's nowhere near or close a plate boundary, then there's really not the likelihood that new magma will form and come to the surface and we will have a new eruption.

tracey: [06:17](https://www.rev.com/transcript-editor/Edit?token=VPjLBcmsS6Pkf1Aahf_fiSnFTzF3JVS7lXQ3mQnEOdeQImHIhrHg8O8Ty-jiUB2TRqDuFdGcqM5LskXOSkWts16HqSM&loadFrom=DocumentDeeplink&ts=377.34) Okay. And for the ones that we have designated active and people live near, how good are you guys at predicting when these things are going to erupt and how do you do that?

Arianna: [06:30](https://www.rev.com/transcript-editor/Edit?token=zukldBIDvwqxx7eqMVWbA99TWHfIzbGLH5drR1RF63JwWLiS-GisojOAB6AJ75Ih4nUNtiE_0zwCU8sgiLtr9hCtqxE&loadFrom=DocumentDeeplink&ts=390.67) So we definitely try to monitor active volcanoes, focusing on the ones that are most active that erupted more frequently. And also that are surrounded by large communities. So for example, Mount Vesuvius in Italy has a lot of people that live on its flanks. And so it is densely monitored. Mount St. Helens is a famous volcano. There's not necessarily a lot of people that live nearby, but there's a lot of tourists. So that volcano is also heavily monitored. Other volcanoes that are in most remote areas, such as Alaska, some of them are more monitored for scientific reasons. We're really interested in trying to figure out what's going on, but then some are really far out of reach and no one really lives as close to them. So they will have less sensors on them. And there's a bunch of different kinds of sensors.

Arianna: [07:30](https://www.rev.com/transcript-editor/Edit?token=FKXMkRnb8zpcYL8hsxdW-Saaxp7yuEQMzYBAP4J69BW5CZpQQ5NSANJs1MVzyT_I5ofZlI_Ok_r8aSU1Uas7SWFGcf0&loadFrom=DocumentDeeplink&ts=450.9) So we have seismometers, and those help us pick up on magma that might be rising. So when magma rises in the volcanic conduit, it does a couple of things. So the first one is it might create fractures and sharps, and those are picked up by these seismometers. And it's because it's rising up, there may or may not be a good path. Maybe the path of the conduit got closed off during the latest eruption because the magma cooled down in there and it plugged it. And so now if it wants to come up, it needs to make cracks and fractures to make its own way up. The other thing that happens when magma rises up is that it inflates the volcano. It makes it balloon if you will, because there's some more material that's coming up and it's pushing the mountain upwards.

Arianna: [08:27](https://www.rev.com/transcript-editor/Edit?token=NTkumGtC5Blff_i3IxPCowvFNvlgzCAJs9uJpjv9g0TrFu3MZNEYsy0k6z_cnWe2y5tn4ygdwkQyv3rEr8HbWavPIWU&loadFrom=DocumentDeeplink&ts=507.45) And we can also pick up on that with GPS sensors, they are linked to satellite, so a satellite will shoot down a signal and the GPS receiver will get it and shoot it back. And we can measure how long it takes for the signal to travel. And so even if we have a very small inflation, a millimeter, we are able to pick up on that, which is amazing. So we can see a volcano shake and inflate as magma rises up. And then we can also check out gas composition, because as we were saying earlier, when this magma rises, gasses starts to exsolve, to make bubbles. And this happens at different depths, depending on what gas. So the most common volcanic gas, it's actually just water vapor, but we also have CO2 carbon dioxide and we have sulfur and those all exsolve at different depths. So if we can collect some of the gas that's coming out at the vent and we can analyze, we can tell how deep or shallow the magma is more or less. So we'll be able to see if it's rising.

Arianna: [09:41](https://www.rev.com/transcript-editor/Edit?token=0Lv0i_0bTr4e6gYCXx9PnA93bOdrb_rJiUOZwhToW8BOcouZ9lcOCQglDM_ZdIqf22yXzkezo4poC2XEhS40mvdC-88&loadFrom=DocumentDeeplink&ts=581.09) Now, this is not an exact science, eruptions do occur even at heavily monitored volcanoes without scientists being able to pick up on that before it happens. And this might depend on location of the sensor with respect to the path that the magma is taking rise up. Sensors, they are not functioning all the time. They can broken, unrepaired or it can be battery that is out. All of these things happen, unfortunately. But we have been getting better and better at predicting eruptions and there's definitely a number of success stories.

Arianna: [10:32](https://www.rev.com/transcript-editor/Edit?token=UR3llDgQq-oSrGPeSSuxD00w8kKshKJTzFdw3PjK90WpWHDHcKN0x-7-g_stF_qKDw_7cLQZJ35GzndFF7y5ab_tFOY&loadFrom=DocumentDeeplink&ts=632.92) Mount St. Helens is the first one. We definitely knew that something was happening. We were able to evacuate the national forest and this definitely saved a lot of lives. The same thing happened with the Pinatubo eruption in the Philippines in 1991. And actually, there's a good collaboration going on between the geologic observatory in the Philippines and the USDS here in the US. And they were able to tell that the volcano was about to erupt and again, they were able to equate a lot of people.

Tracey: [11:09](https://www.rev.com/transcript-editor/Edit?token=oiV8WeXpc7sELJ-KaJiIuJ2DeoDut0BjASxd-0Mc5Dlmv6UaC64qWxfWLQzFKkzPp6zijBlIzDRitQ0sJHrOLTa8Iac&loadFrom=DocumentDeeplink&ts=669.81) And especially with something like Mount St. Helens and usually when you think of a volcano erupting, you think of all these dramatic pictures, the night sky and the lava shooting up into the air. And it's really cool. Mount St. Helens just basically exploded out of the side. Can you talk a little bit about what made that one so different or certain ones like that where it's not so much just lava kind of pouring down out of an active volcano, but just blowing out an entire half of a mountain or a volcano instead?

Arianna: [11:43](https://www.rev.com/transcript-editor/Edit?token=E67Ug2MBdvXD9BKoGfe4u7vI1fk8vpS-ru9bAMri6tyPjrCCkl1GEFPkQ5hmNzvKADN9YHXIi4sii7r0PKcYxBKLvrE&loadFrom=DocumentDeeplink&ts=703.51) Yeah. So this definitely does happen. And Mount St. Helens is an example of what we call a lateral blast and the eruption had several stages. It was very interesting how it got triggered. Basically, we did have some magma that was rising up and there was an earthquake and this earthquake triggered a landslide on the north side of the volcano. Now this landslide was very, very large. And so what happened is that all of a sudden there was a lot less rock on top of the magma that was rising. And so there was a lot less pressure keeping the magma down and it was all on one side, it was all on the North flank. And so the magma that was rising and it was under pressure because of all of the gases were exsolving, it went in that direction and it blew to the side.

tracey: [12:44](https://www.rev.com/transcript-editor/Edit?token=SVUlheJBf3lEYMMc-0bDp6Sajl5X2jYAs0ssOPLMY-eDiuf6wqKVPHl27cjbcreuVz2uJkjcSfuOWu-pbzJpP-aAiVw&loadFrom=DocumentDeeplink&ts=764.53) So it's just going to find the path of least resistance, right?

Arianna: [12:49](https://www.rev.com/transcript-editor/Edit?token=JSznpNkJcoLpldIkyQvlW70zxemiH7zC5Vt0M5_ZbrhhGaJrQXvAf3ADUe4uojaSu4sqt-uBigArLv0q6SKtHHyqTps&loadFrom=DocumentDeeplink&ts=769.77) Yes, absolutely. This is a really good way to describe it.

tracey: [12:55](https://www.rev.com/transcript-editor/Edit?token=uh5H31rV52ZII0CxXU68QcooLye4RtTdoDKZK3ODhJSAgu6SNaYH8zc1VfBTMftRTZXp7-k5zowsakqKMUNUzNfb_3I&loadFrom=DocumentDeeplink&ts=775.53) Yeah. Okay. All right. Great. So when these volcanic eruptions happen, like with Mount St. Helens, and it blasted all of this ash and debris into the air, and it was terrible, do these things affect climate, short and long-term?

Arianna: [13:14](https://www.rev.com/transcript-editor/Edit?token=Lsec7yLK9021hKlFoBGwq9MP25wV6aS8tRff3fbjqc2L8pNnRUDUUr6bBZfkffMkuZUCIRNtIdgToXFGD3REBf1pYP8&loadFrom=DocumentDeeplink&ts=794.45) Yes. Volcanoes definitely have an influence on climate. And it's complicated the way in which this happens because you have short term effects and long-term effects. So in the short term, what you can observe is cooling. And this is because you're going to have a lot of ash particles in the atmosphere. And so this just kind of mechanically block out the sun. So there's less sun rays that reach the surface of the air and the surface cools down. In the long-term, however, you can have warming. And this depends on the finer particles and the gases that are emitted specifically, sulfur dioxide does this, and this can trap some of the infrared radiation that reaches to the surface in the lower atmosphere. And so this can cause an increase in temperature, but it's the really large eruptions that do this.

Arianna: [14:18](https://www.rev.com/transcript-editor/Edit?token=XU1E6pHZ0MawdMl0_OMcuC_CobUQznJJppEgaTwo7npcGt9xtEsFQkxQuk2tytNjDd3Na_WayYfVBzKv7I9d3M7LCVg&loadFrom=DocumentDeeplink&ts=858.01) So something like Mount St. Helens, I know it looks really, really large, but it's not large enough to affect the climate actually. We were thinking about the Laki eruption in Iceland or the Tambora eruption in Indonesia, really orders of magnitude larger than any eruption we have witnessed certainly in the course of our lifetime. And then the other interesting thing that has an effect on weather and how much volcanoes influence climate is where the volcano is. If the volcano is closer to the equator, it has a higher chance of affecting the climate than if it is closer to the poles, and these depends on a circulation patterns in the atmosphere and where those particles will be dragged.

tracey: [15:14](https://www.rev.com/transcript-editor/Edit?token=4G-ZaKSjju9ORvGMgzzbOKeitS6k19ve-H1a-56qac8NhySyi1wIUr99frAvaX6NHsvjGFXjaOG0FhgoXTzTAVsTwmY&loadFrom=DocumentDeeplink&ts=914.19) Okay. And how long did these particles sort of persist in the atmosphere before they settle out?

Arianna: [15:21](https://www.rev.com/transcript-editor/Edit?token=8IeEa_cmwXNTtUaWZAnD3JBrPBrdr88OajS8NNoxUUt-T33JKDvFBqm0zEP_MCkTKejHXhPz6_-Ny93hpEFb-9ninCA&loadFrom=DocumentDeeplink&ts=921.23) They can linger for years. Ash is usually only a few days to a few weeks, but they really, really fine ones and the gases, it can be a couple of years or even more.

tracey: [15:35](https://www.rev.com/transcript-editor/Edit?token=ZGeFK06uxhpA86L2WFTFzADrWNCkVBPna5needWDzxbOHhlTDb5Egn_Odm4T0tpJsY3iPysCc9GSk6aXGaY9SIV43fc&loadFrom=DocumentDeeplink&ts=935.63) Wow. And there was another phenomenon that people talk about when they talk about volcanic eruptions, volcanic lightning. Is that? How does that work? That's kind of cool.

Arianna: [15:45](https://www.rev.com/transcript-editor/Edit?token=J5sFtH8V4rZME_GYtilQ4-u3v7xa1-_A1Mmc-hFj_S7tmITMlh1BKhSRORGMwlBhnHmV2FGmbIgyf_6ITQggccZEqbw&loadFrom=DocumentDeeplink&ts=945.7) Yeah. So volcanic lightning I think is super cool. And actually some of the people who work on that are colleagues from where I did my postdoc in Munich. So volcanic lightning occurs in volcanoes that have explosive eruptions where you have these ash column that develops. So an ash column is a lot of ash particles that are squeezed tightly together and rub against each other. And this creates friction and friction leads to electric charging. And so when you have positive and negative charges, you can have current going through, you can have a discharge and this is volcanic lightning. And it's a phenomenon that we've already started paying attention to in recent years. Now that we started paying attention to it, we are seeing it over and over again at most volcanoes that have ash columns.

tracey: [16:56](https://www.rev.com/transcript-editor/Edit?token=POdxS6tamnreLg8tD0zQiPMODu76UY-ASaKlAzUkFJG_wjnsy0Dow4Aai99_eJbpibXEVq44fsi2e1Te2CXJIiYYGJk&loadFrom=DocumentDeeplink&ts=1016.1) That's really neat. So it's almost like static electricity from walking across a carpet, but except if you're a volcano. The most fascinating thing to me about volcanoes is just the lava, lava coming out, lava doing lava things.

tracey: [17:16](https://www.rev.com/transcript-editor/Edit?token=aVgA6hDSlWiUsibAmMfGeAO59Sua5PM7DFgmLDAoFnxG-b2mSGER-OJuCSzDSnAHLtZntGZ2-f8718Z5q3wEAb-Wjdo&loadFrom=DocumentDeeplink&ts=1036.84) Yeah, lava is great. I guess, unless you're in the path of it but... So how fast does lava really move? I grew up watching all of these disaster movies, in seventies and eighties to date myself a little bit. And it was always people like running, screaming out of these giant waves of lava, but in real life, how fast does that stuff go? What's the actual danger from lava that you're going to get run over by a wave of lava or that it's just going to burn everything down around you?

Arianna: [17:49](https://www.rev.com/transcript-editor/Edit?token=lOcqqx3bDmGwIqHb8PmZcu5XSR4jsh0BdQP7JWAER1W9of2sXq_piwu9tL5Q2PNHp8OI0ZJex21QExdH4InsNA8Mtoc&loadFrom=DocumentDeeplink&ts=1069.92) That it's going to burn down everything around you. So lava typically does not flow very fast. We're talking maybe about a half a kilometer per hour, so you don't even need to outrun it, you can just outwork it. The problem is that your property can't. So the main hazard from lava flows is that it destroys everything in its spot. There is pretty much no way to stop or diverted and so people can move out, but we are not able to save their property. I think what a lot of people don't realize is that lava is hot rock. So it has an enormous strength and enormous pressure. So when it's coming at you, there's really no structure, there's really nothing that can stand up to it.

Arianna: [18:57](https://www.rev.com/transcript-editor/Edit?token=nAqlogNtYp4ufQVJ60azUzx5B4GxGOGHl8pMhon8VQxOLqmrGr7i6JTzAB9M9pbcvcz0oBgTMjtcy_9vFpXnEDiRRsM&loadFrom=DocumentDeeplink&ts=1137.81) Now that said, there have been a few exception of really fast lava flows that have been dangerous to people as well. Particularly, there's been an eruption in 1977 of Mount Nyiragongo in Africa, where lava flows came down the flanks of the volcano at 60 kilometers per hour. Now that is something that we cannot outrun. And unfortunately, the eruption did kill a lot of people also because it happened unexpectedly and in the middle of the night.

Arianna: [19:37](https://www.rev.com/transcript-editor/Edit?token=QvF52yvFTGbsX8TaOlkZ3g9vXVvcJGNc-OIAceM61YfxK0U4VKS0CGhMZOnP00f3FhBysUzwrXP1CSDJh6ilZZRBxDw&loadFrom=DocumentDeeplink&ts=1177.55) The reason why those lava flows were so fast is that the lava from that volcano is very, very fluid. And also it was coming down from a lava Lake. So there was the pressure of the Lake emptying down and pushing it down to the side like if you make a hole at the bottom of a water bottle. But we normally don't see anything that fast, what got closest to it was the 2018 eruption of Kīlauea in Hawaii that you may remember, and that was about 30 kilometers per hour. But we did a great job of evacuating people in time. So fortunately, no one was injured by the lava flows in that case. Although unfortunately, a lot of property was lost.

tracey: [20:25](https://www.rev.com/transcript-editor/Edit?token=tN-a7OWfpWqG0iPA064yq2rmwVMo_n_MqluwLrhbv5Db4DPZHNnbDAO3TAHqzaz3lPNMb9WtK6BljBn6Y9iZk_YhLdI&loadFrom=DocumentDeeplink&ts=1225.93) Yeah. That is a shame, but at least no one got hurt. And the only thing about lava is it's flowing like a liquid, but it's not really the same as a liquid. If you stepped on lava, would you fall in, or would you just sort of skate across the surface, catch on fire and die horribly that way? Like what would happen?

Arianna: [20:47](https://www.rev.com/transcript-editor/Edit?token=kXXhspVw1iZIpK1aM_CBvIv7xaRg0oNWt8W8JS-BowSYsH2l4G1FLx8Os-eTkZU_PGZtpVSwJNu0nMTf8EBDoKEGMLo&loadFrom=DocumentDeeplink&ts=1247.68) Yeah. Pretty much what you described. So yeah, lava is rock. Even when it's flowing, it is not really liquid. It is partially molten, but there's a lot of crystals in there that are solid and form a network. So it feels solid. Definitely, having sampled, active lava flows, it's not like scooping up some water. You have to hammer it pretty hard to get a piece out. So if you were to step on a love of flow, you would just step on it, it would sustain your weight for sure. You would, however, yes, catch on fire very rapidly. Lava flows are really hot we're at over a thousand degrees Celsius so more than twice what your oven at home can do, and that would not be a pleasant experience.

tracey: [21:52](https://www.rev.com/transcript-editor/Edit?token=TFKBqBKn1oxtCCXXp9SuX6SYDCs_FJrSaX7XKAG2u54HzapTeJZlqFdFMv91MVLI7_KffscV9FaOHYMfRnDnu9QbZ80&loadFrom=DocumentDeeplink&ts=1312.72) So how do you guys get samples of these stuff? Like if it's a thousand degrees Celsius, how can you get close enough to it to actually sort of break off a piece of a lava flow?

Arianna: [22:07](https://www.rev.com/transcript-editor/Edit?token=ARHU37j6Ne3ap44Z5noftjeTpVWOBWXvrl1pMbUKerwvGryK1yetz56ORMyXCDbmXqcZpZ6o2BNPEsZCqvGRz30Mx84&loadFrom=DocumentDeeplink&ts=1327.14) Two strategies. Either you wear a full heat resistant suit, like the typical feel very vulcanology suit that you see in the movies. And now that's great. However, those things are real heavy and bulky. And so if you're hiking up to a lava flow for six hours, you're probably not taking one of those with you because you also need to be taking a lot of water and the rock samples you collect, and your hammer, and food and flashlights. So the suit is probably not going to make the final packing list. So what you do instead is you're quick. So you wear long sleeve cotton clothes and you get close for a second. You hammer it as hard as you can, you step back. And you try not to look because your eyes are kind of like the most delicate part of your body that's going to be exposed. You're going to be wearing goggles while you do that of course, but still you're going to be able to feel that heat. So you just kind of get close hammer it, step back, and then recover that sample.

tracey: [23:24](https://www.rev.com/transcript-editor/Edit?token=2OCR2yzlW4MrymIKFjSipwpeLMdJDm3FAc4va72Ds7WUpKaInuy0Hc5NsQStTe6inYjFHGC3Xf-ph8wDaO2LzpcrnHM&loadFrom=DocumentDeeplink&ts=1404.23) What is it like being close to a lava flow?

Arianna: [23:31](https://www.rev.com/transcript-editor/Edit?token=61_5isAPmktKXaJjJzP14ubM9-Nae9GC3Rbb2ZMlObu4Gh9DPUYmk3EbNe6u9-lzm1oD9ZOeYEgX3mvISmmc0dEF5II&loadFrom=DocumentDeeplink&ts=1411.92) Oh, that's my favorite thing to talk about because we see these images of lava on TV and they're beautiful. They're fascinating, but being close to one, it's a multi-sensorial experience really. The heat is the first thing that you feel. I mean, it's incredible. It's like standing in front of an incredibly hot oven, so there is this dry hot air that comes at you. The first time I saw a lava flow, I was doing field work and I did sampling and then I wanted to have a picture taken in front of the lava flow. And there's this picture of me smiling in front of the flow, but I'm actually in horrible pain from the heat coming at my back. And it was a smile, click, runaway sort of thing.

Arianna: [24:32](https://www.rev.com/transcript-editor/Edit?token=yrtO8t-AWT-CljorWLH2u4fVSoO4zvr6P6Wc-Xnhs_ishAjgcMP_8BJt9X8MupDFKl300LFyzXWpws0n61Qph2Y68fo&loadFrom=DocumentDeeplink&ts=1472.09) And then the other thing that's interesting is the sound so lava makes a clinky sound when it flows because on the sides you have these pieces that start solidifying. And what lava is really is volcanic glass. So as you step on it, you're going to hear it crack under your boots. So it's like stepping on glass. It is also very [cutty, so you have to be careful of that. And as it flows in also makes these clinky, glassy sound. So that's also something interesting that I didn't really think about until I got to hear for the first time.

tracey: [25:22](https://www.rev.com/transcript-editor/Edit?token=HiRZDT1sK9nyRuPTRCdkPqLDe0Bo3BO3qTINlcPKchK-clgEIk1X0yNUDMRlOVCk8mdvjbvMcClIkzh3qkhuhVynUPA&loadFrom=DocumentDeeplink&ts=1522.34) That's amazing. Yeah. I wouldn't think about that either.

tracey: [27:50](https://www.rev.com/transcript-editor/Edit?token=gCnvIQMgy6nbNd5BXMZU67vct6XmvGu954RGux1FxKjteAJUN3wZ9UkywdULvzVLwJatvgN9ECisSXYvrHsaG42Y9Dk&loadFrom=DocumentDeeplink&ts=1670.11) And finally, what is the coolest fact about volcanoes or lava that you know - your favorite thing?

Arianna: [28:17](https://www.rev.com/transcript-editor/Edit?token=XwtDc5zH5kPqjk0ZQqA5-qYOXA36zjBheMkU87sdkVLwufa1zDXASDkEX0sQi6Xl1izPaFVQjarwgLJFY_8AVjU0BL8&loadFrom=DocumentDeeplink&ts=1697.83) Yeah. So my favorite thing about volcanoes is that they are actually the makers of land. Volcanoes create new emerge land for us to walk on. So entire islands, such as Hawaii would not exist if it wasn't for volcanoes and these islands keep expanding even nowadays. So the 2018 eruption of Kīlauea actually added about half square kilometer of land to the coastline of Hawaii. And that is land where eventually the vegetation is going to grow and it's going to become stable. And it is part of the Island. So volcanoes are the only geologic phenomenon that can actually expand our land borders and give us new land to work on. And it's amazing to be the first person to walk on a fresh lava flow, because that is literally earth that was not there up until the day before. So in a way, volcanoes are really the last frontier of human exploration because they push the boundaries of what is there for us to explore.

tracey: [29:45](https://www.rev.com/transcript-editor/Edit?token=I40U_iyCenUo6KlOPrIsz05IVanvhbvlsfFgTRVL--Qpwk7Fh64ucwAZPZjTrZ___obRnV6yZ58SztuMNZ13qoF5g54&loadFrom=DocumentDeeplink&ts=1785.23) That is really cool. Well, thank you so much for being here today, Arianna. I think we learned a lot about volcanoes. I know I did. And now I would like to one day get close to a lava flow, but maybe not super close just to listen to it. I think if nothing else.

Arianna: [30:02](https://www.rev.com/transcript-editor/Edit?token=Wk89fHgtJgWuyJn0MrYGbtsXUeHlSkNXmv4NPmoKmFokEOexQuoYKyYoFIOPMHz8R04TCcIRclBfeEuczZS8LrK6jt4&loadFrom=DocumentDeeplink&ts=1802.96) I personally, encourage everyone go visit a volcano. There's several in the world that are less dangerous than most where tourists often choose to go and visit and can witness lava flows. And it is really a primordial experience to be that close to volcanoes. They're kind of the sign that our planet is alive and being there and being able to witness and feel that is definitely an experience to have once in a lifetime. So thank you so much, Tracey, for giving me the chance to talk about my favorite subject.

tracey: [30:54](https://www.rev.com/transcript-editor/Edit?token=3YHDFK0NIYdUa-m0J5sSPcwzF73lux3YaUHQjd_HQK9QszAE9zse-RJVpb4B0_dBUUwJiY3WVtQqEKec1ULN-6JUyaY&loadFrom=DocumentDeeplink&ts=1854.91) We've been speaking today with Arianna Soldati, a volcanologist and assistant professor of Marine, earth and atmospheric sciences here at NC State. This has been audio abstract. I'm your host, Tracey Peake. Thank you so much for listening.