



Hot Sauce Hot Spots

Plume sauce

By Eric Muller



Introduction:

Model hot spot island formation, orientation and progression with condiments. By squirting a thick condiment sauce and a coarse weaved fabric, you can model the formation of island hot spots.

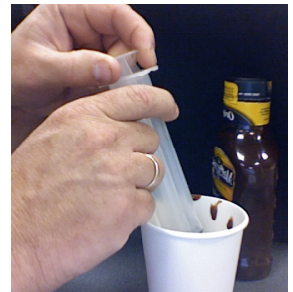
Materials:

- Almost any thick (non-runny) viscous sauce or condiment: Mustard, Ketchup, BBQ sauce, Hot Sauce, Chocolate sauce, etc
- Almost anything that squirts a viscous liquid like a condiment: Condiment squirt bottle, Turkey baster, Syringe, condiment packet, etc
- A self-contained devices work great too (squirters and substances) such as: Cheese Whiz, cake frosting, tube of toothpaste, etc
- A porous fabric or mesh
Window screen, Grease spatter screen, coarse cloth, peg board



To do and notice:

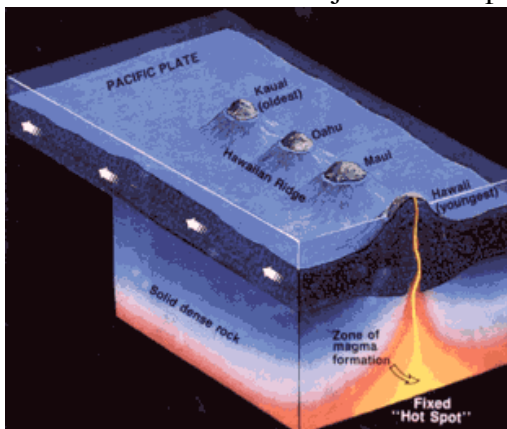
1. Fill your sauce squirter.
2. Place your mesh on top of the squirter.
3. Move your mesh in one direction (linear).
4. Squirt your sauce up and through the mesh.
5. Squirts can be a continuous stream of sauce or regular spaced/timed intervals.
6. Notice the pattern of sauce mounds.



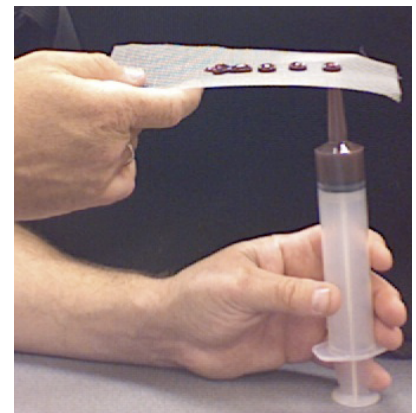
Whats going on?

You should have a series of big and little sauce mounds. These mounds get older the farther they are from the source of the sauce (the squirter).

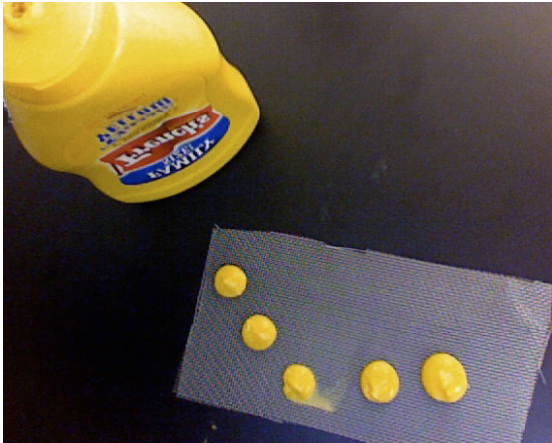
This is a model of how volcanic island hot spots form. There are about a dozen major tectonic plates that migrate about the earth's surface.



Plates move about as fast as your finger nails grow, a few centimeters a year. A deeply rooted, stationary source of molten material (represented by the sauce in our model) works it's way through the plate (represented by the mesh). As the material erupts and cools, it builds up into taller and taller undersea piles of volcanic material, volcanoes. If a volcano emerging from the oceans' surface it forms an island. As the plate moves over this source of magma (represtned by the motion of the mesh), the magma eventually finds another



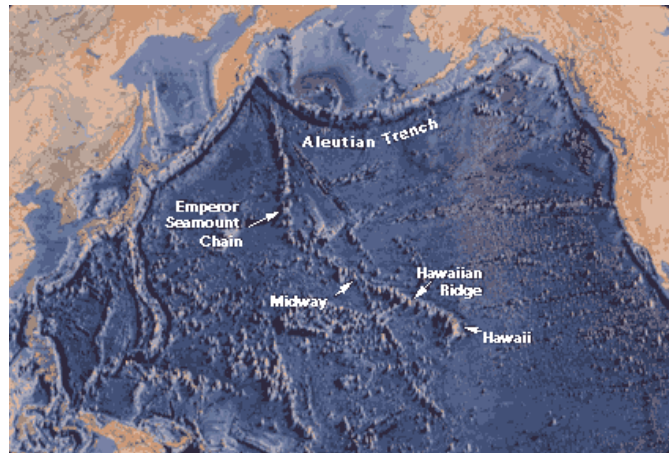
location to emerge from the crust. A linear series of island volcanoes may form a single hot spot. Although tectonic plates move slowly (a few centimeters a year), given enough time, a chain of islands can form that are thousands of kilometers long.








Option:

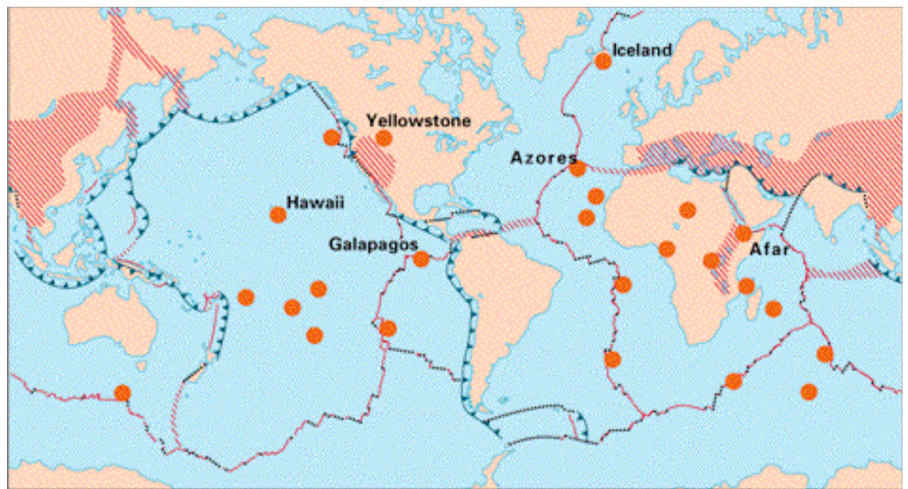
Change the direction and speed of your mesh.

Hawaiian Emperor Seamount Chain— A 6000km long chain of islands that changed direction about 43 million years ago. This can be seen in the map of the Pacific ocean floor below.



Hot spot locations around the world:

- EXPLANATION**
-  Divergent plate boundaries— Where new crust is generated as the plates pull away from each other.
 -  Convergent plate boundaries— Where crust is consumed in the Earth's interior as one plate dives under another.
 -  Transform plate boundaries— Where crust is neither produced nor destroyed as plates slide horizontally past each other.
 -  Plate boundary zones— Broad belts in which deformation is diffuse and boundaries are not well defined.
 -  Selected prominent hotspots



A great resource:

<http://pubs.usgs.gov/gip/dynamic/hotspots.html>

Graphic drawings are from the U.S.G.S