

Intro to Permaculture Climate Zones, Climate Change and Permaculture Video Transcript

The big question we are answering this week is “Where am I?” Our Permaculture design is a unique and site-specific response to that question. When we know where we are, then we can design for the conditions of that place.

We need to begin to answer the “where am I?” question from out in space, looking in at the planet and seeing the big patterns that ultimately determine things like wind, rain, heat, cold, sun, snow and fire for our location. So I’m going to give a very brief overview of Earth’s climate types.

We have this band of moisture moving around the equator and, as you can see, the motion is generally moving East to West.

Then we have this band of moisture moving from West to East in both the Northern and Southern hemispheres and this is called the jetstream.

Then we have the poles that are roughly circulating East to West around the top and bottom of the planet.

So we’ve got cold air on the poles and warm air at the equator, and the jetstream is basically where those two air masses meet. Now if there was never any exchange of air between these masses, the poles would get colder and colder and the equator would get hotter and hotter. But temperature is always trying to find equilibrium, so warm moist air masses move out from the equator towards the poles, and cold air pours from the poles towards the equator.

The moisture from the equator moves out, sometimes as a hurricane, typhoon or tropical storm, and then gets entrained in the jetstream and starts moving from West to East. And the arctic air travels down over the continents and brings cold weather. The areas by the coasts get less cold air because the mass of the ocean acts as a temperature moderator.

So this is how the climate zones are created: We’ve got wet and seasonally wet tropics in this band around the equator. Then we have the sub-tropics that are typically dry out from there to what we call the tropics of Cancer and Capricorn at around 23 degrees. Then we hit the temperate zones, which get hit by the jetstream and are cooler and wetter. As we move higher we hit the Arctic Circle in the North, and mostly ocean in the South.

We can see that when we zoom into North America. There are these different air masses that influence our weather, and they basically take turns with each other. Sometimes that arctic air mass comes down deep into the continent and causes a cold snap.

Sometimes the hot and dry air builds up in the interior of the continent and builds a dome that the jetstream just stays up above.

Sometimes the jetstream brings cool moist air as rain and snow over the continent, and sometimes tropical air comes up and gets entrained in the jetstream, bringing warm rain on the coasts and interior.

Let's go back to our original question: Where am I? You can better answer that now that you have some context of where you are within the global climate, and why things vary the way they do. But what happens when we add climate change to this pattern? Well, things in the weather start to go a bit haywire, and that's what we are experiencing now.

With warmer oceans, more heat needs to be exchanged to bring about temperature equilibrium. The Arctic is heating more than anywhere else, as reflective ice is substituted by dark ocean that can absorb heat. So the jetstream, which was pressurized by the difference in temperature between the equator and arctic, is now weakening and changing positions more sluggishly, so cold stays longer, drought and heat stay longer, and storms stay on the same track for longer, causing flooding.

So answering the question "Where am I?" means knowing what extremes to expect. We are designing Permanent Agriculture and Permanent Culture. That means our food, water, shelter and energy systems are designed to be resilient and able to handle the hottest and coldest temperatures, strongest winds, longest dry spells, and biggest storm events. Extreme weather is where the rubber meets the road and our systems are tested for their endurance and resilience.