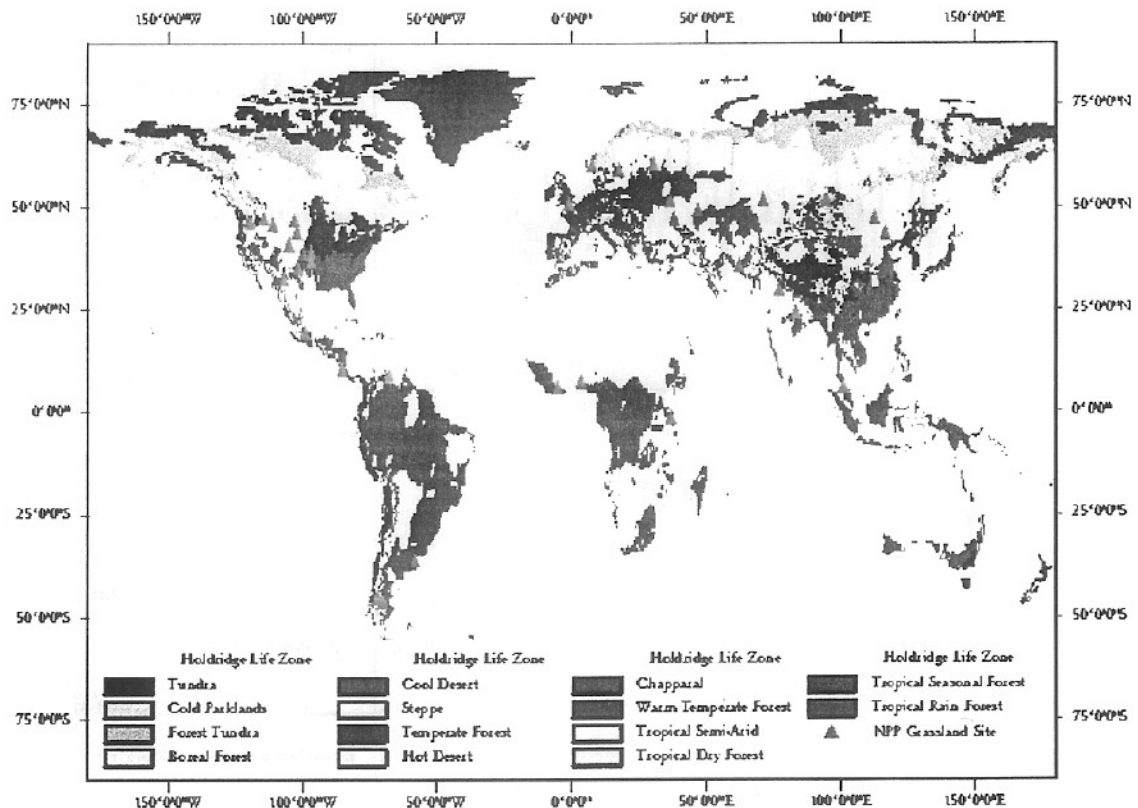
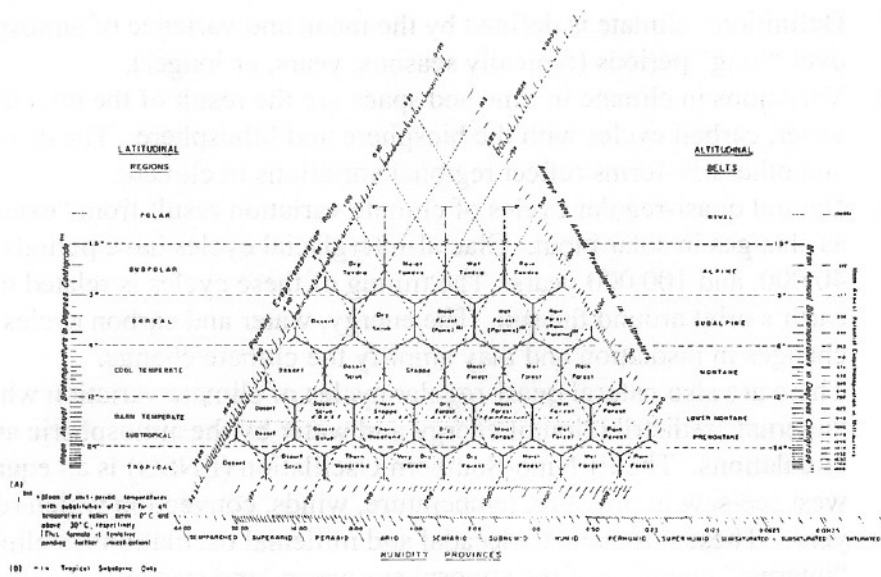
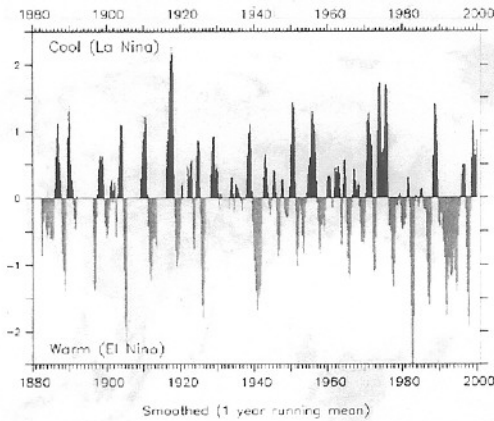


1. Definition: climate is defined by the mean and variance of atmospheric condition over “long” periods (typically seasons, years, or longer).
2. Variations in climate in time and space are the result of the interaction of the energy, water, carbon cycles with the biosphere and lithosphere. The distribution of biomes and other life-forms reflect regional variations in climate.
3. Natural quasi-regular cycles of climate variation result from “external” forcing such as changes in solar input. Glacial-interglacial cycles have periods every 20,000 years, 40,000, and 100,000 years. The timing of these cycles is related to the changes in the earth’s orbit around the sun. The energy, water and carbon cycles respond to the changes in insolation and may amplify the climate change.
4. There are also natural quasi-regular cycles of climate variation which result from “internal” redistribution of energy and water by the atmospheric and oceanic circulations. The El-Nino-Southern Oscillation (ENSO) is an equatorial Pacific east-west see-saw in pressure, temperature, winds, convection which repeats every 2-7 year. These interannual, decadal and millennial oscillations in climate result from “internal” coupling of the atmosphere-ocean-land system. Another quasi-regular climate cycle is the Pacific Decadal Oscillation (PDO).





### Southern Oscillation Index



### selected Pacific salmon catch records

