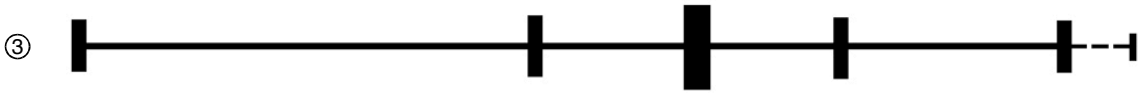
Variation of atmospheric pressure between and within climatic belts

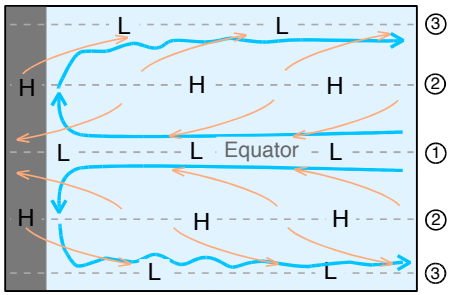
The diagram below shows the variation in atmospheric pressure at three locations that are representative of low-latitude low-pressure zones, mid-latitude high-pressure zones, and high-latitude low-pressure zones. For each, forty-eight months were selected to represent normal conditions (e.g., not during the breakdown of low pressure at Darwin during an ENSO event, and not during the breakdown of the Azores High during a negative phase of the North Atlantic Oscillation). Dashed extensions show the range of pressure over 21 years and thus across the extremes of ENSO and NAO.

The key observation is that the low atmospheric pressure of the near-equatorial zone is remarkably consistent, even across ENSO events. On the other hand, pressure regimes at higher latitude are increasingly variable, so that the range of pressure in Iceland is quite large. This (along with latitudinal variation in the Coriolis Effect) helps explain why the Trade Winds and the equatorial currents that they drive are so consistent in direction and strength, but the higher-latitude Westerly winds and zonal currents can be more variable, as one sees in the migrations and meanders of the Gulf Stream and Kuroshio.

Iceland: High-latitude low pressure

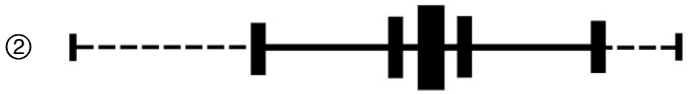
48 High-NAO-Index months January 1990 to December 1993





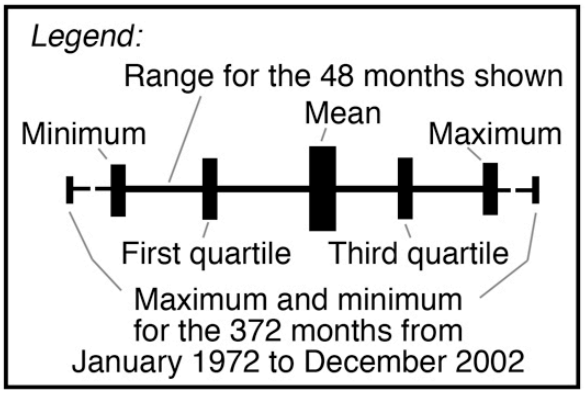
The Azores: Mid-latitude high pressure

48 High-NAO-Index months January 1990 to December 1993



Darwin, Australia: Low-latitude low pressure

48 Low-ENSO-Index months January 1985 to December 1895, July 1988 to June 1989, and January 1999 to December 2000



Data are from the Global Climate Observing System's (GCOS) Working Group on Surface Pressure's webpage for climate timeseries at www.esrl.noaa.gov/psd/gcos_wgsp/Timeseries/ .