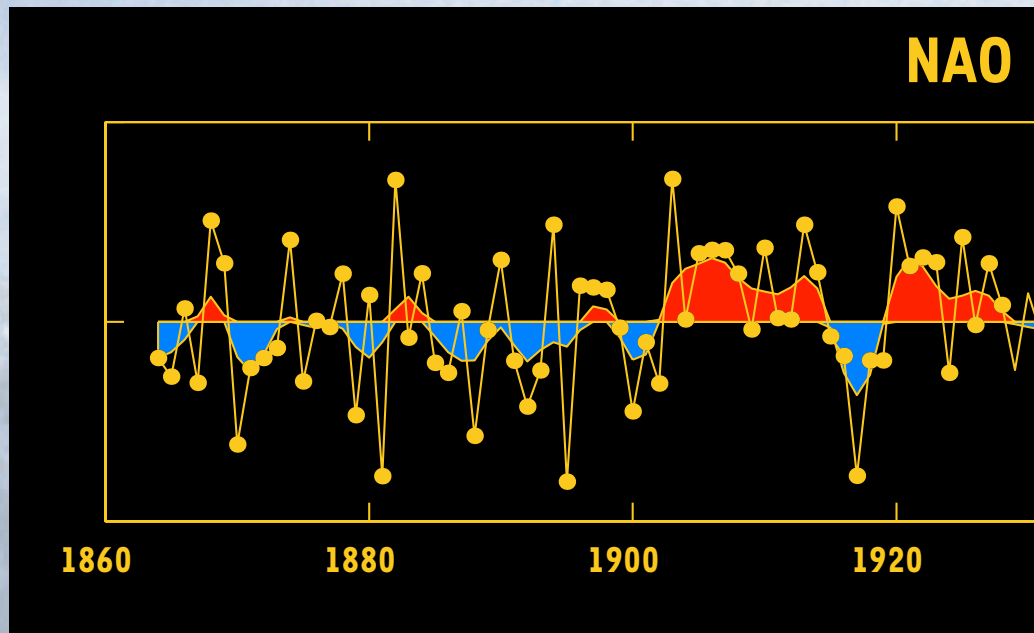


THE NORTH ATLANTIC OSCILLATION NAO

The NAO is a large-scale see-saw in atmospheric mass between the subtropical high located near the Azores and the sub-polar low near Iceland. An index can be derived that tracks the behavior of the NAO through time. The index shows both high frequency and low frequency variability. In the later portion of the record there is a positive trend, steadily increasing with time. The high and low frequency variability of the NAO is believed to be related to natural variations in the

The NAO index is defined as the anomalous pressure difference between the Icelandic Low and the Azores High. The figure at right shows the measured sea level pressure difference between Stykkishomur, Iceland and Lisbon, Portugal over the period 1865-1998 during the winter season (December through March).



NATURAL VARIABILITY NAO & the Atlantic Ocean

The NAO is the dominant mode of winter climate variability in the North Atlantic region. The corresponding index varies from year to year, but also exhibits a tendency to remain in a positive or negative phase for intervals lasting several years (see red and blue sections of the NAO index above).

The characteristic time scale of atmospheric circulation anomalies are only on the order of weeks. However, the ocean, with its large capacity to absorb heat, has significant long-term memory, and may set the pace for decadal variations in the NAO. Ocean currents have the ability to propagate temperature anomalies across the Atlantic, which may influence the dynamics of the overlying atmosphere. As a result, some scientists believe that decadal variations in the NAO are due to 'two-way' communication between the ocean and atmosphere. Other scientists have suggested that the oceanic variability is merely the integrated response of the ocean to high frequency variability in the atmosphere. Another hypothesis is that the NAO might be influenced by variability in the tropical Atlantic Ocean. Once the interactions between the ocean, atmosphere, and land are more clearly understood, it may be possible to forecast year-to-year changes in the NAO.