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Lunar-driven Control of Climate and Barents Sea Ecosystems[1]

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1. Introduction

Herring periods and cod periods along the Norwegian coast have been known for more than 1000 years. Periods of growth in the fisheries, have formed the basis for settlement, industrialization, economic growth, and wealth. Periods, when the fish disappeared, led to emigration, hunger, and poverty. Over the years, one has questioned whether good years, or bad years, were accidental, or ruled by higher powers. The fish stock grew during the 1940s. After 1945, a new fishing fleet was built, which had good years in the 1950s and 1960s. In the 1970s, the herring stock and the cod stock disappeared. Questions were then asked about possible causes. Was there a lack of scientific management, overfishing, or was there something unknown phenomenon in nature, which led to the fish stocks disappearing. This presentation is a summary of a doctoral dissertation in which this topic was studied.

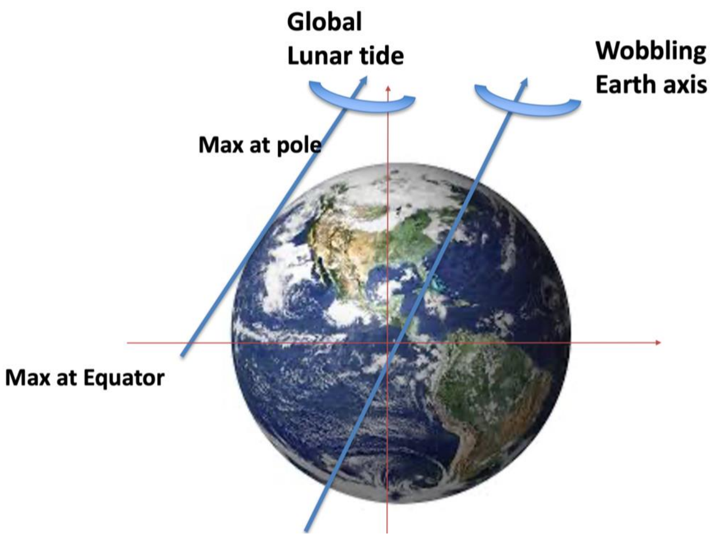

Figure 1. The Earth axis and the lunar nodal tide wave.

[1] The talk can be seen here: https://www.youtube.com/watch?v=EN1WwV9TZ7Y. (Recorded by Yngvar Engebretsen)

The 18.6-year cycle

Gravity between the Earth, the Sun, and the Moon, cause the Earth's axis to change direction, in a period of 18.6 years. The earth's axis nutation period introduces a standing lunar nodal tidal wave, between the pole and the equator, with a period of 18.6 years. The tidal wave has a maximum amplitude at the poles and the equator and a node at about 35 degrees in the orbital plane.

The tidal wave of 18.6 years leads to a vertical mixing of between cold and warm temperature layers. The result of vertical mixing is that the surface water has a periodic change of 18.6 years, which follows the ocean currents northwards, and affects the climate. The tidal wave has a $\pi/2$ (rad) phase lag from the earth's axis nutation period. The lunar forced temperature period has a $\pi/2$ (rad) phase lag from the 18.6-year lunar nodal tide. Over time, a set of lunar forced temperature periods of 18.6 years is produced, which gives periodic spectrum of [1, 2, 3, 4 ...]*18.6 years. Coincidences in the lunar forced temperature spectrum give climate periods up to 75, 223 and 446 years. A wavelet spectrum analysis of data series has identified periods of [1/2, 1, 4]*18.6 years in the inflow of North Atlantic water to the Norwegian Sea, Barents Sea, the NAO index, land surface temperature and rainfall along the Norwegian coastline. Arctic ice extent from 1570, has periodic variations in periods of [1, 4, 12]*18.6 years. Greenland temperature has periods of [1, 4, 12, 24]*18.6 years.

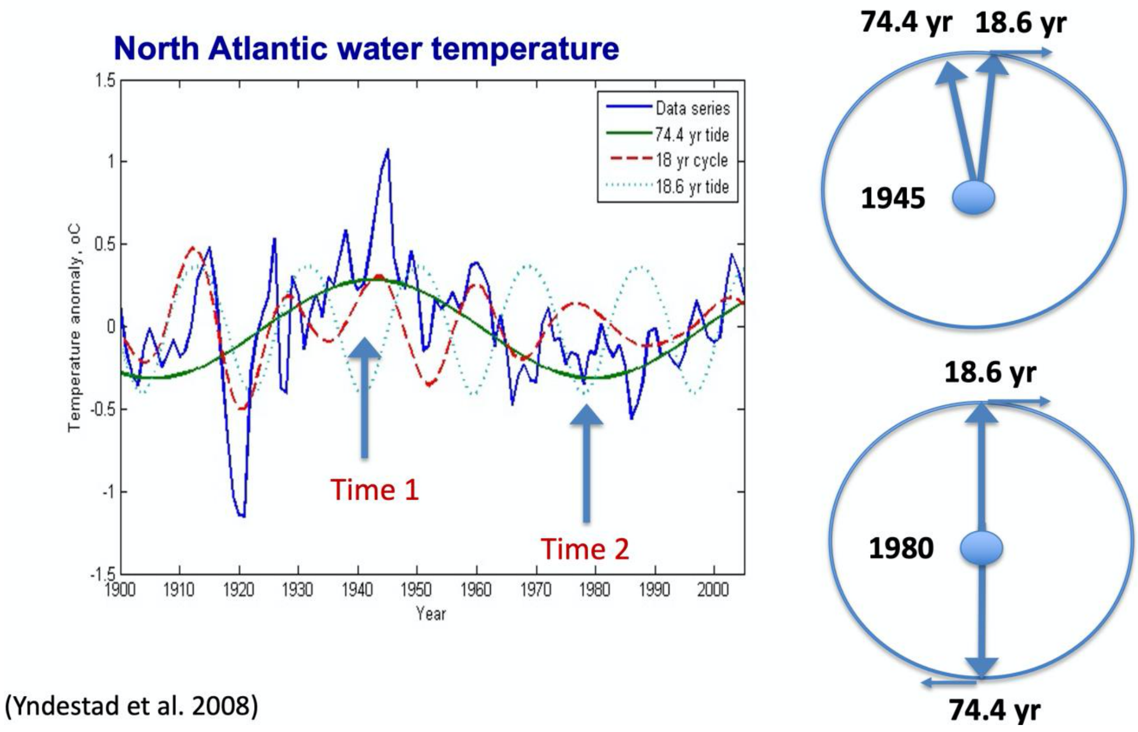

Figure 2. The North Atlantic water temperature cycle

2. The effect of the cycle on the fisheries

A study of Barents Sea ecosystems shows that green algae, plankton, herring, capelin, and cod follow a periodic variation of [1/2, 1, 3, 4]*18.6 years. The capelin stock recruits in periods of (18.6/2)/3 years, which optimizes the capelin stock over a period of 18.6/2 years. The cod stock recruits in periods of 18.6/3 years, which optimizes the stock's growth over 18.6 years. The cod stock period of 18.6 years, at the same time follows the temperature variations of 3*18.6 years and 4*18.6 years, which has an average period of (3 + 4)18.6/2 = 65 years. Herring periods follow cod stock periods. The explanation for good fishery periods and bad fishery periods, is recruitment, growth, and mortality, adapted to sea temperature variations of [1/2, 1, 2, 3, 4, ...]*18.6 years. The explanation for the biomass collapse, is allocation of catch quotas, which do not follow period phase-variations from sea temperature variations of [1/2, 1, 2, 3, 4, ...]*18.6 years.

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