ICES CM 2006/C:02
Climatic variability in the ICES area 2000-2005 in relation to previous decades: physical and biological consequences
Maastricht, 19-23 sept 2006

Lunar nodal tide effects on climate and eco system in the Nordic Seas and the Barents Sea

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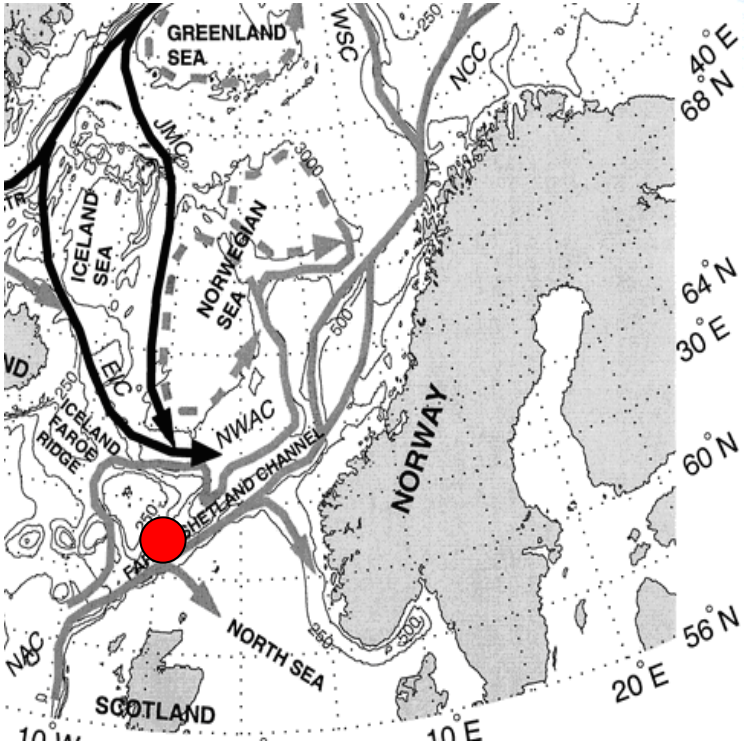
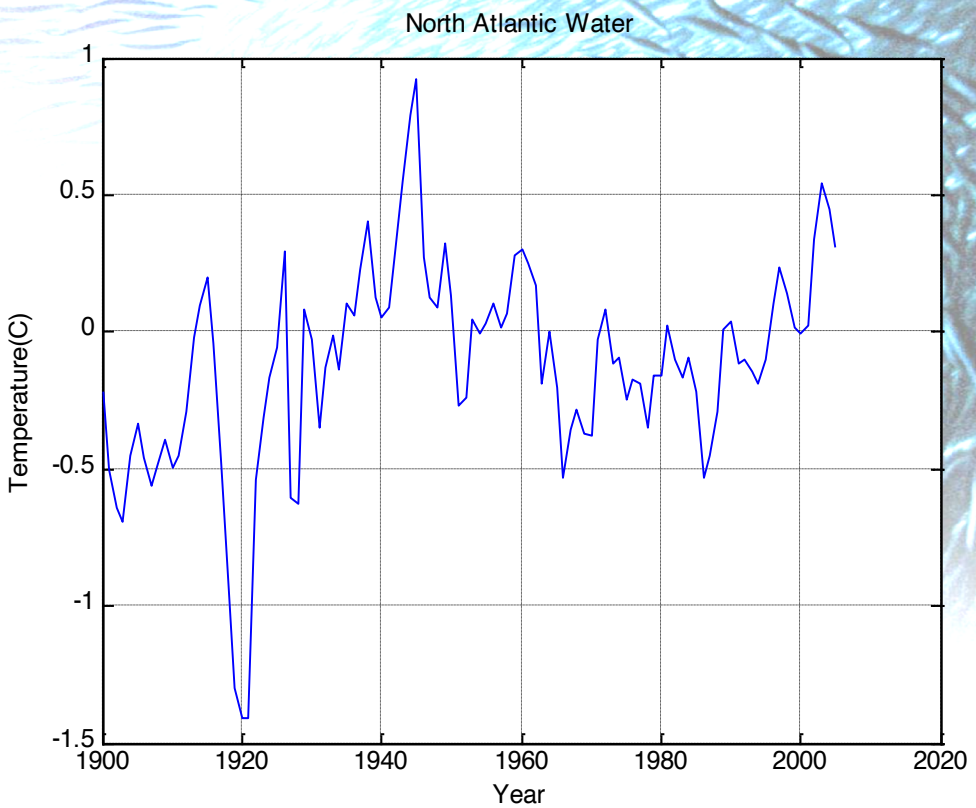
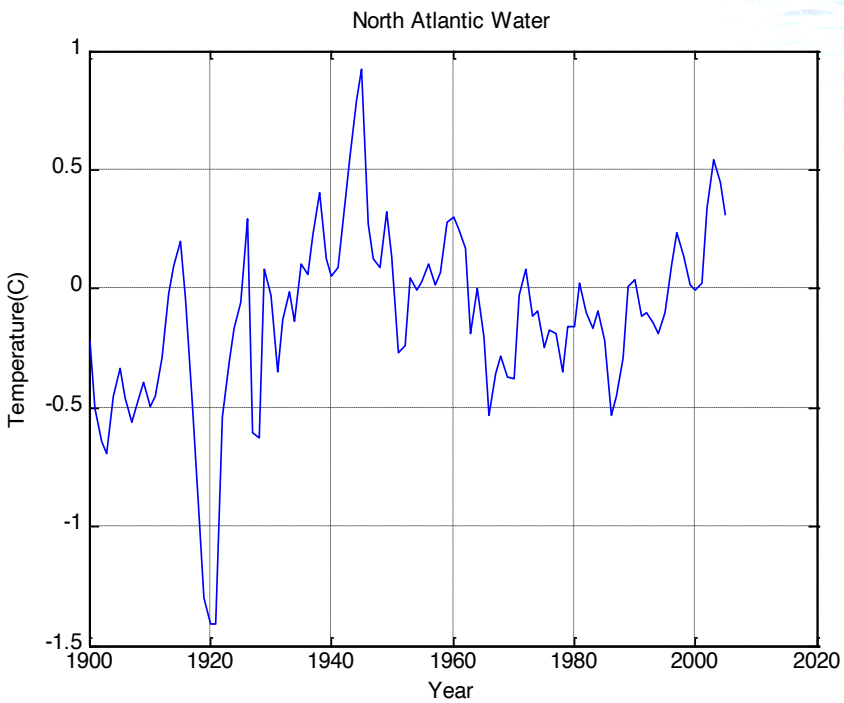
North Atlantic Water temperature

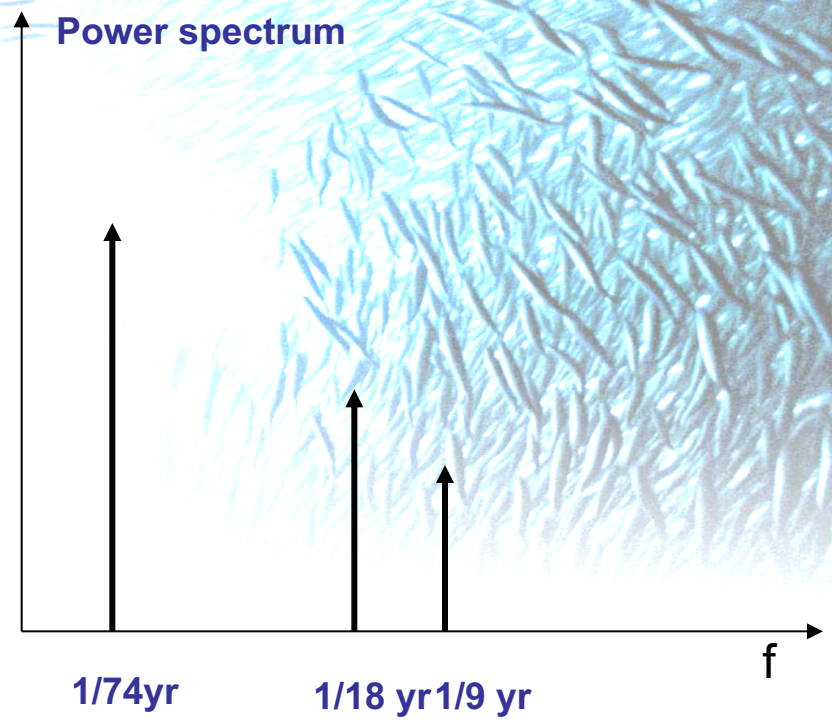




Large fluctuations in a period of 100 years
A fundamental cause?

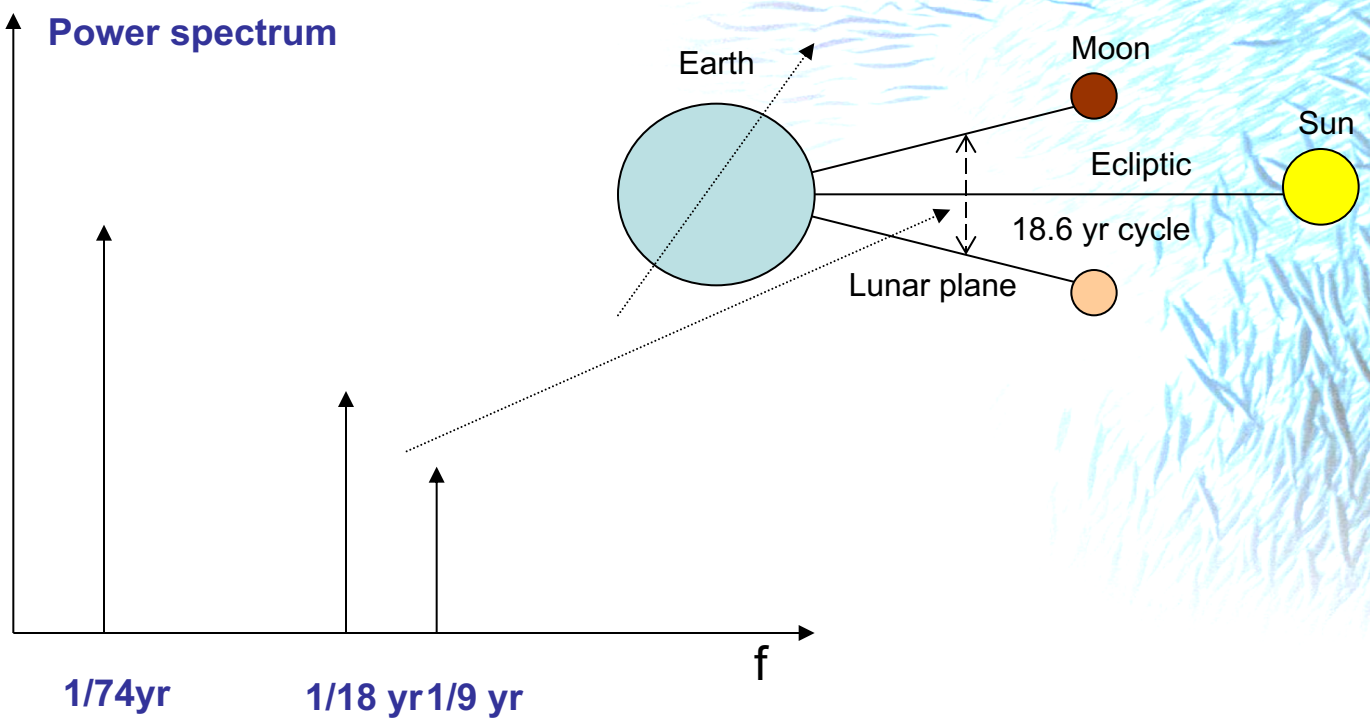
Dominant periods





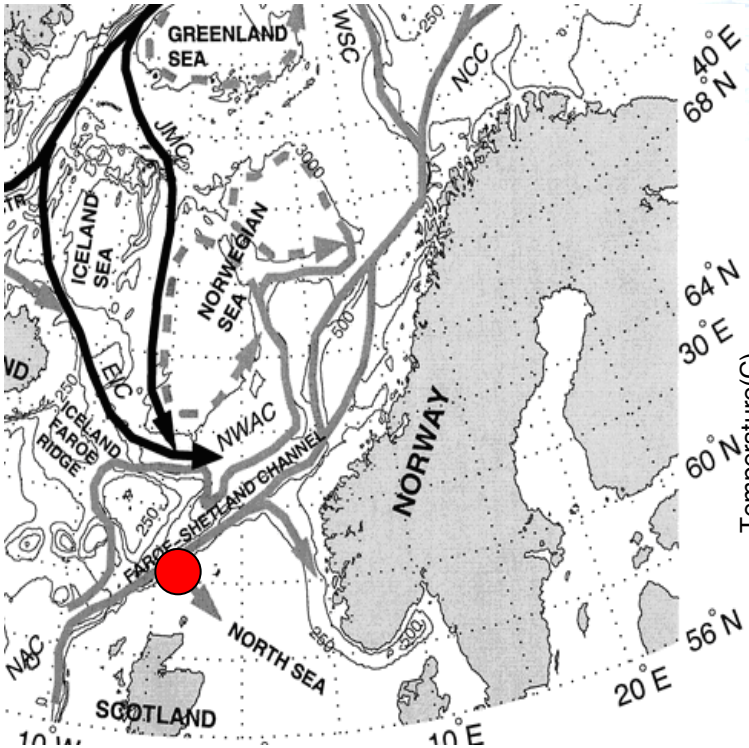
Wavelet spectrum analysis:
Dominant cycle periods of about: 9, 18 and 74 years

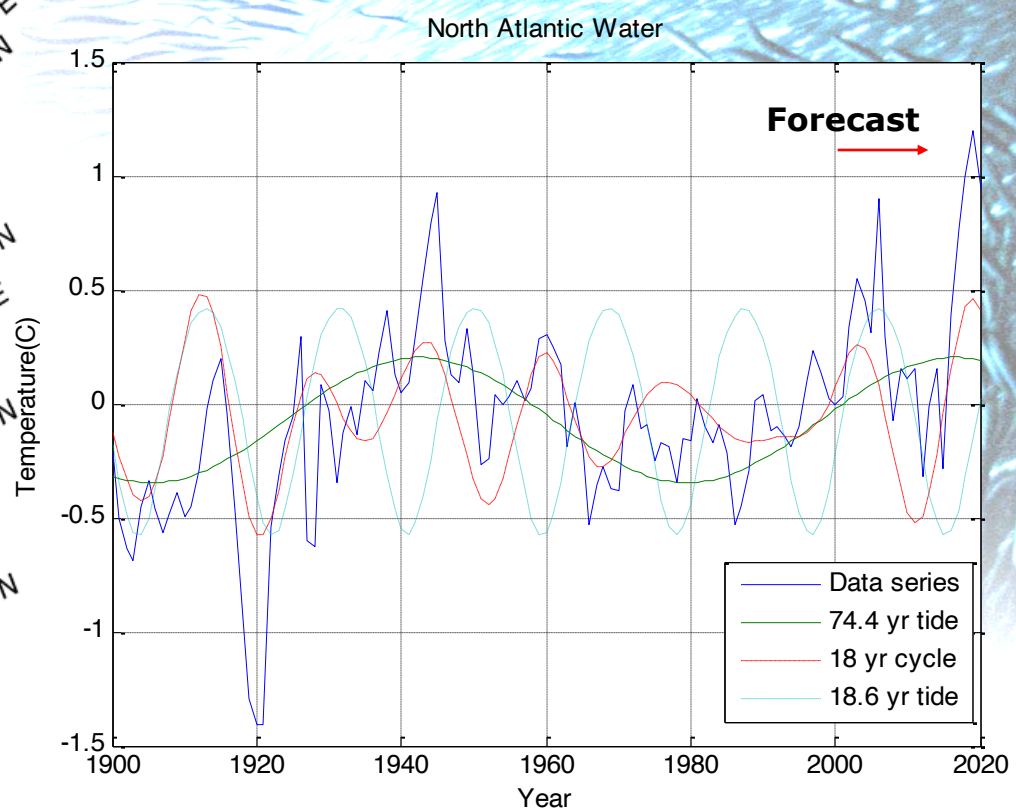
The period source



1. The source: The 18 yr and the 9 yr cycle are correlated to long-term lunar nodal tides
2. The 74 yr cycle: A sub-harmonic cycle of about 4*18.6=>74 years
3. The implication: Deterministic long-term fluctuations

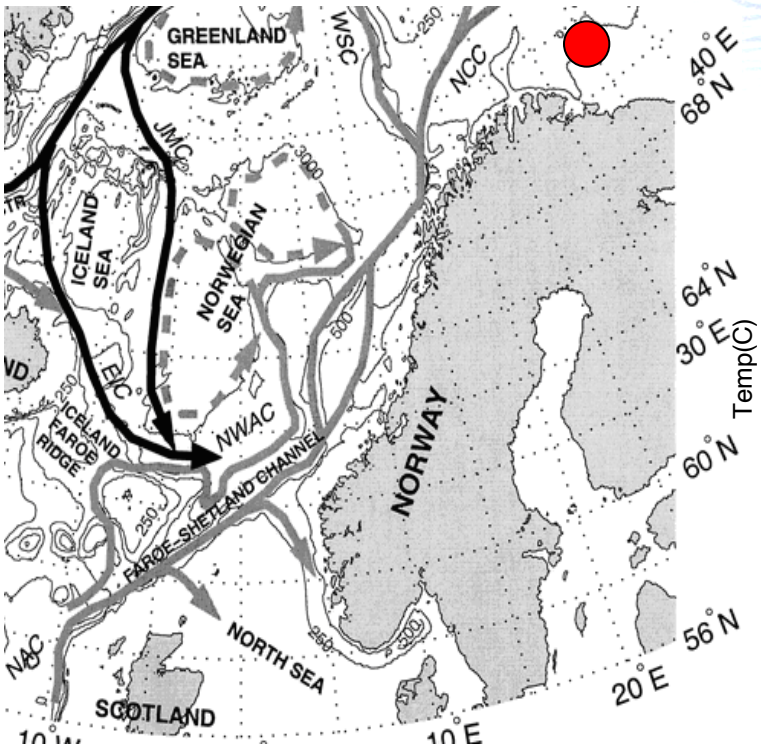
North Atlantic water oscillation

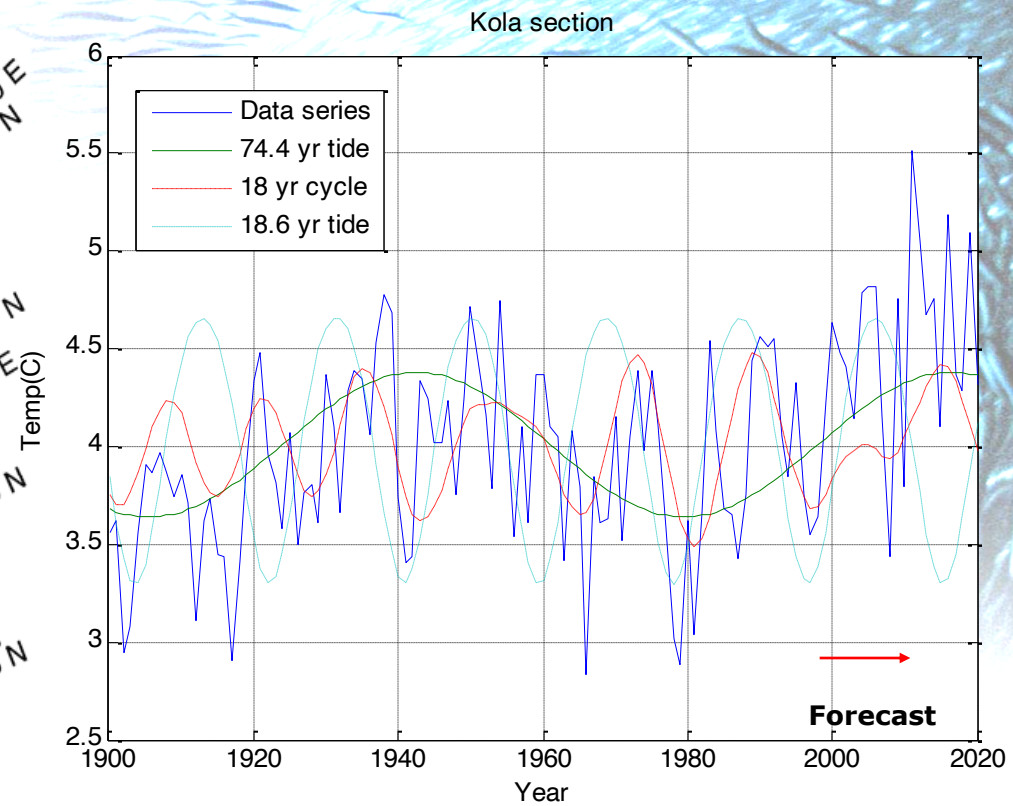




1. Dominant cycles: Correlated to the 9.3 and 18.6 yr lunar nodal tides
2. Fluctuation mean: Correlated to the sub-harmonic cycle of about 4*18.6=>74 years
3. 15 yr: Forecast by Neural Network

Kola section temperature oscillation





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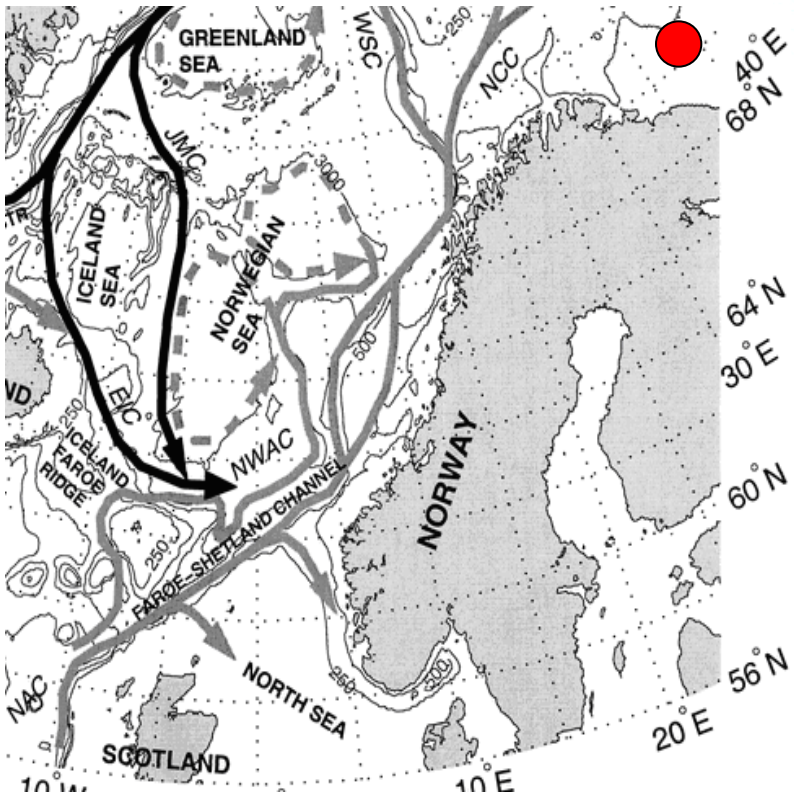
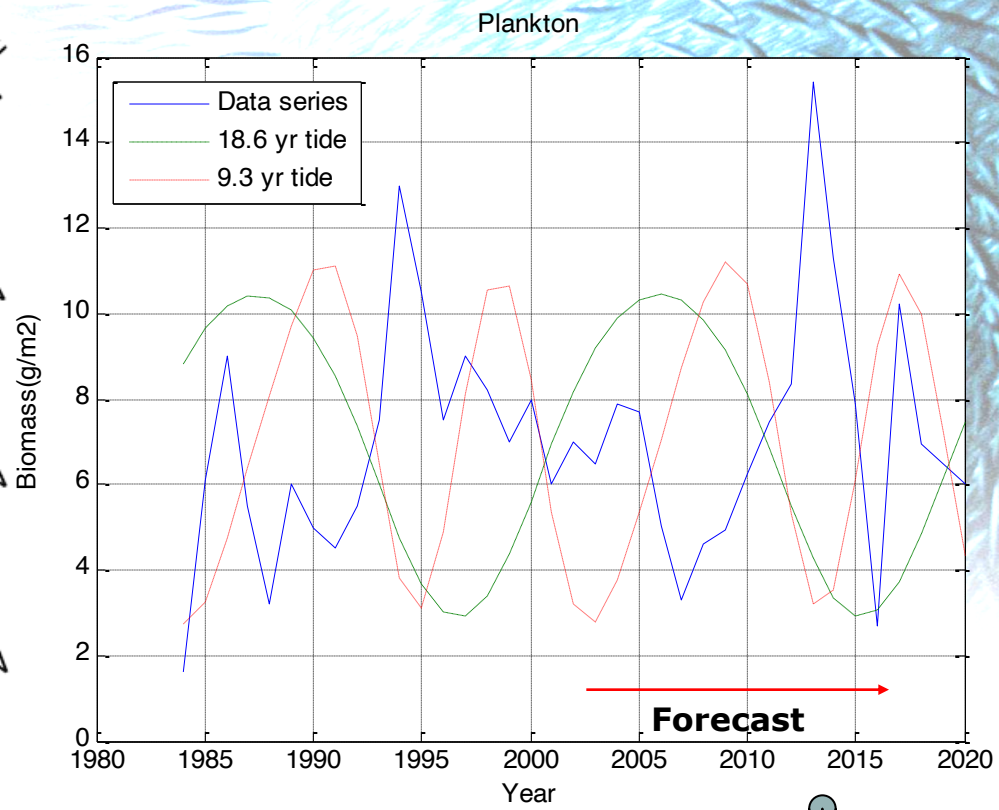
Barents Sea zooplankton





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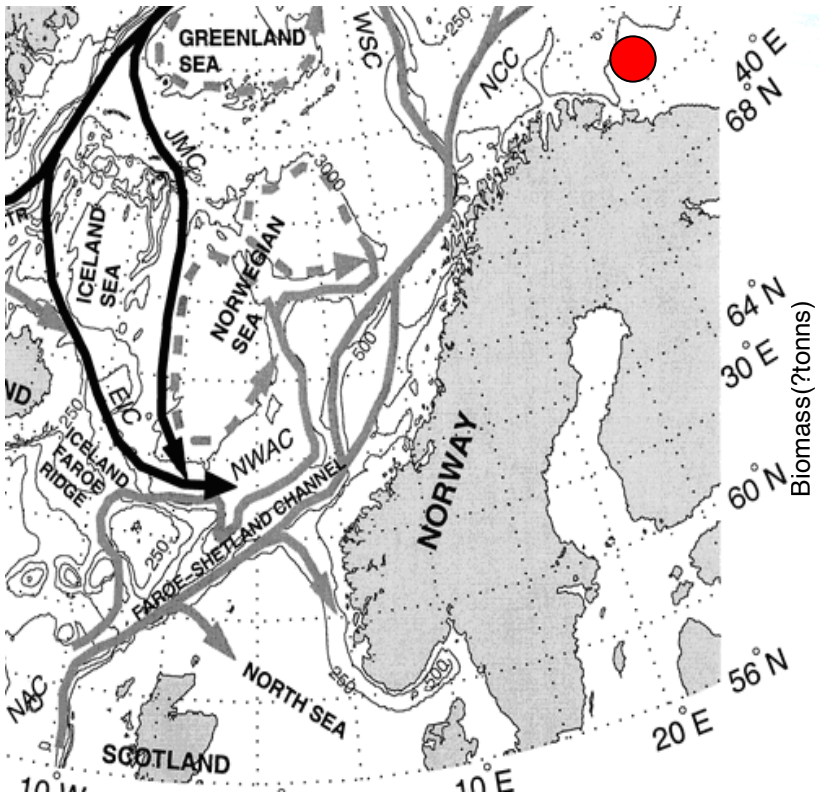
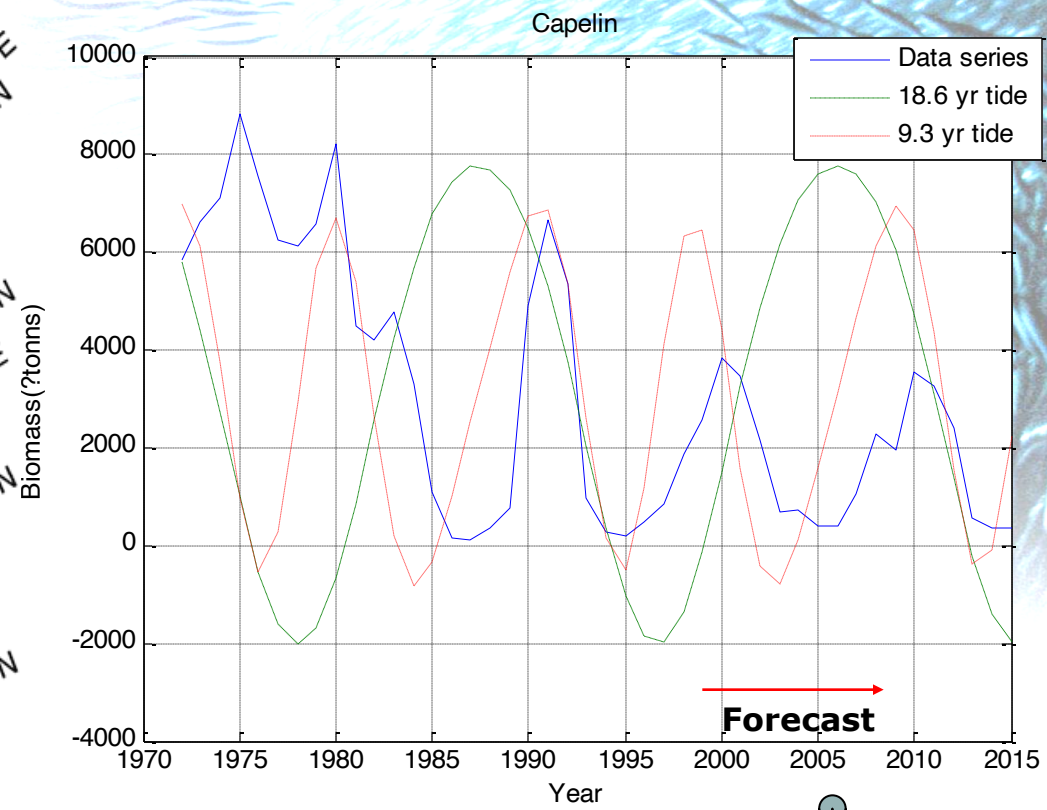
Barents Sea capelin oscillation





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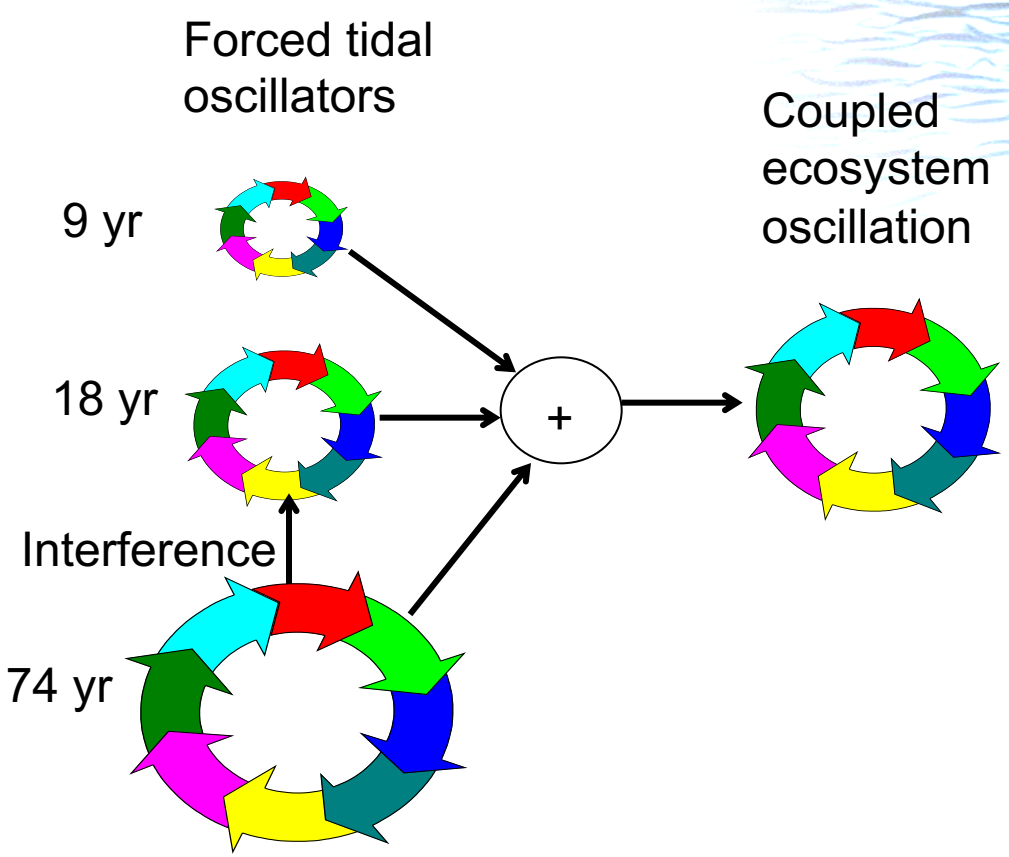
Coupled ecosystem oscillation



1. Forced oscillators: A set of long term tidal cycles
2. Interference between cycles may change the cycle phase
3. Eco system a coupled dynamic system
4. The phase: Dynamics is dependent on the phase relations

What is happening?
All cycles are positive at the same time