

EARTH ROTATION IN SIGHT OF CLIMATE MODULATIONS

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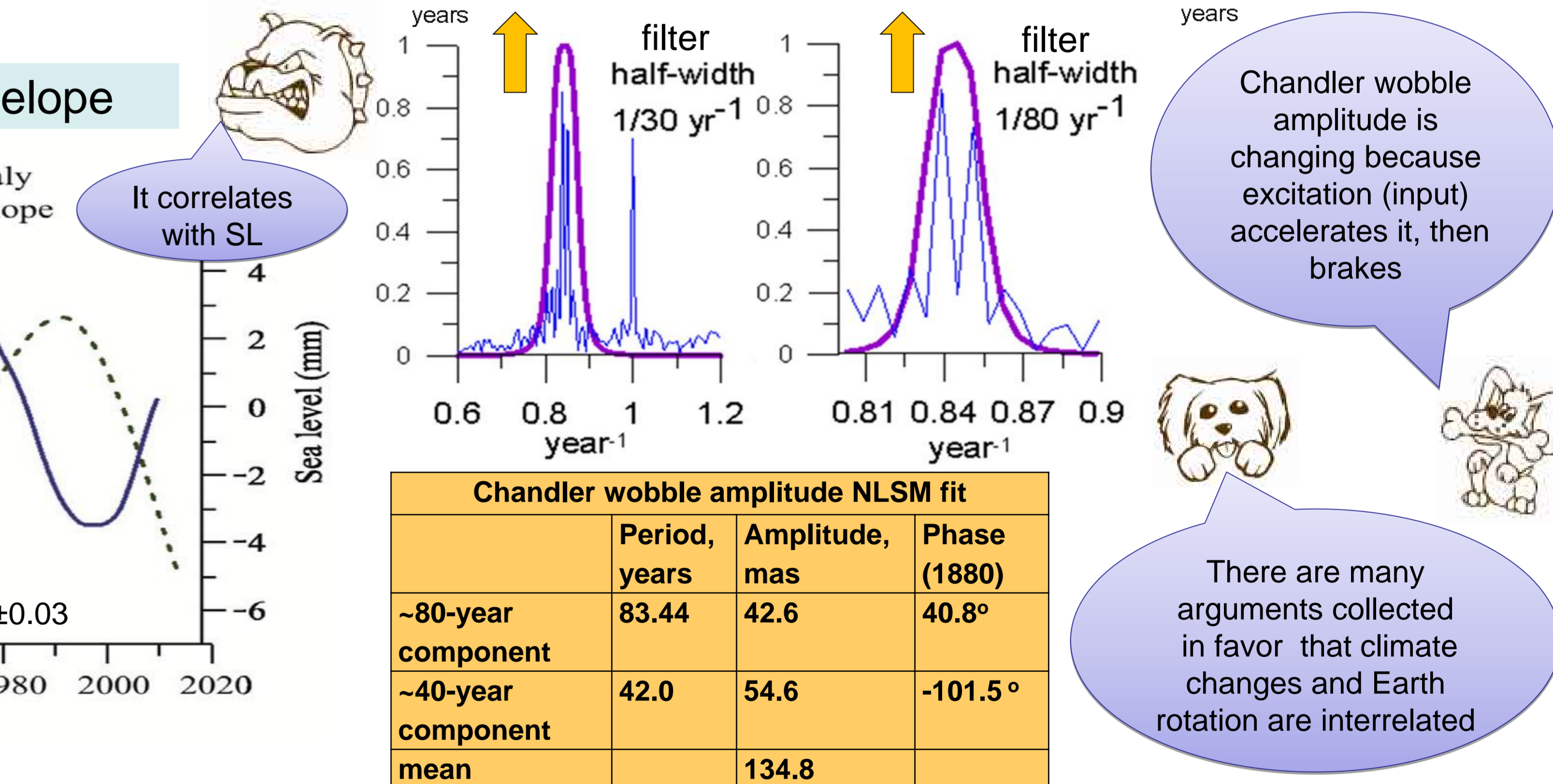
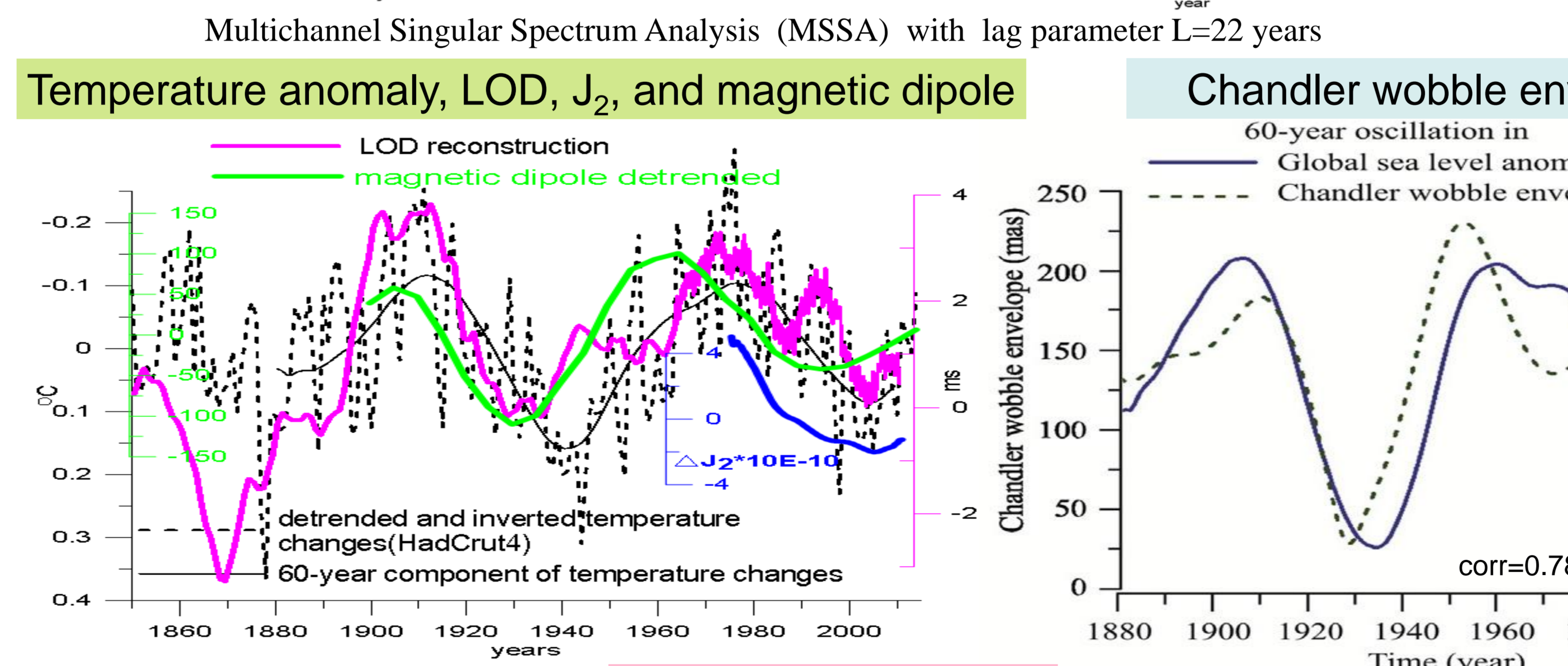
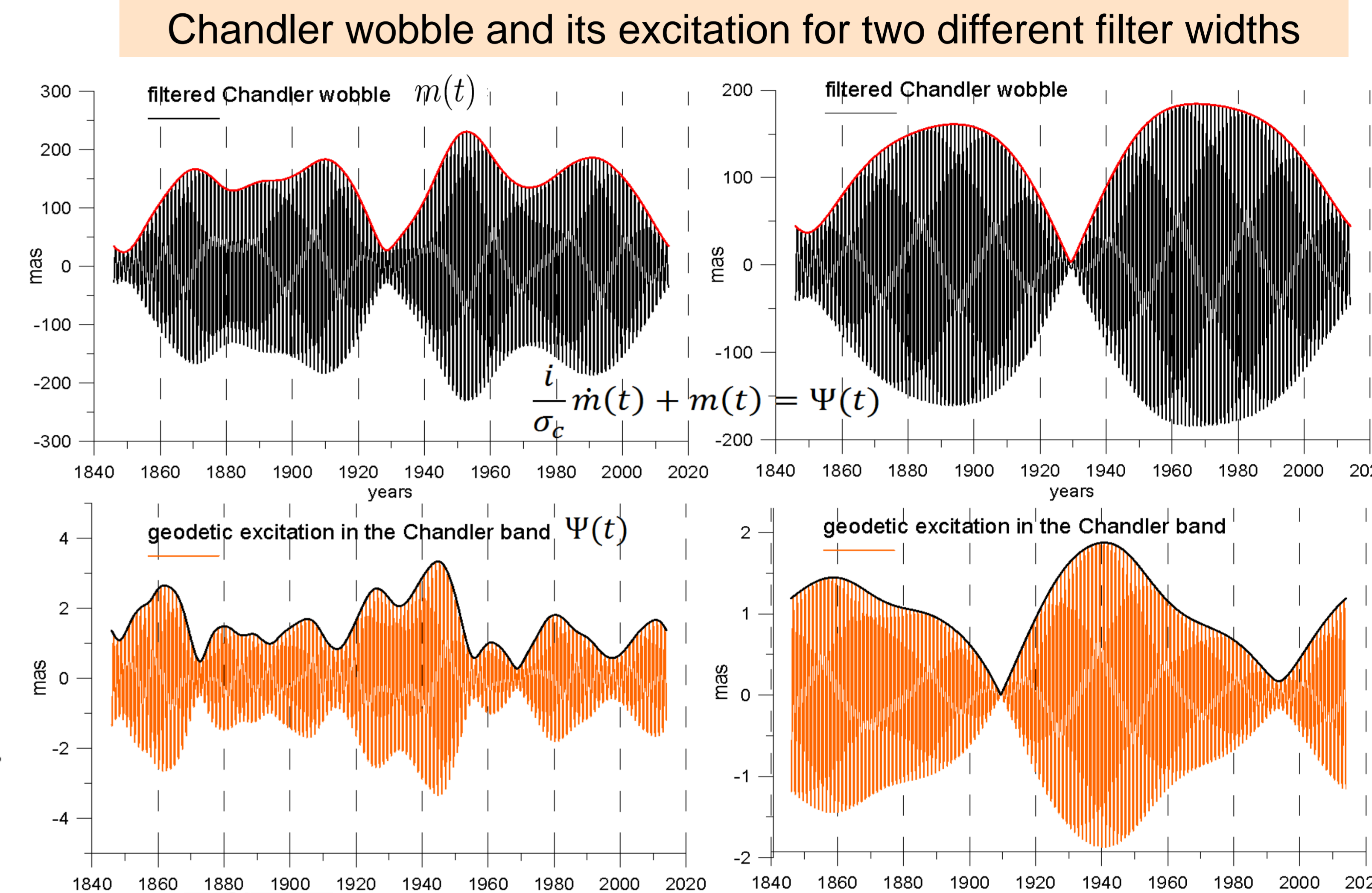
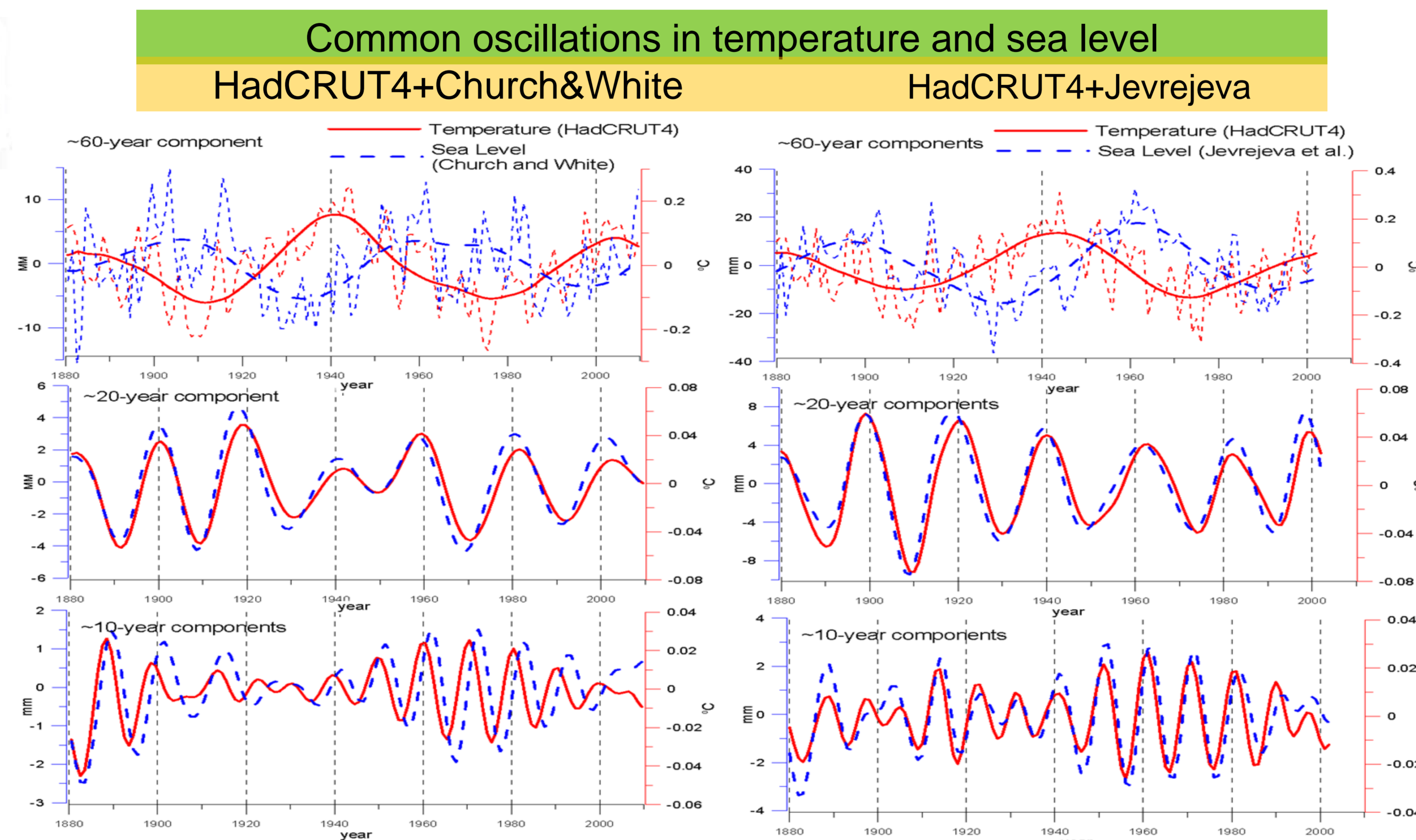
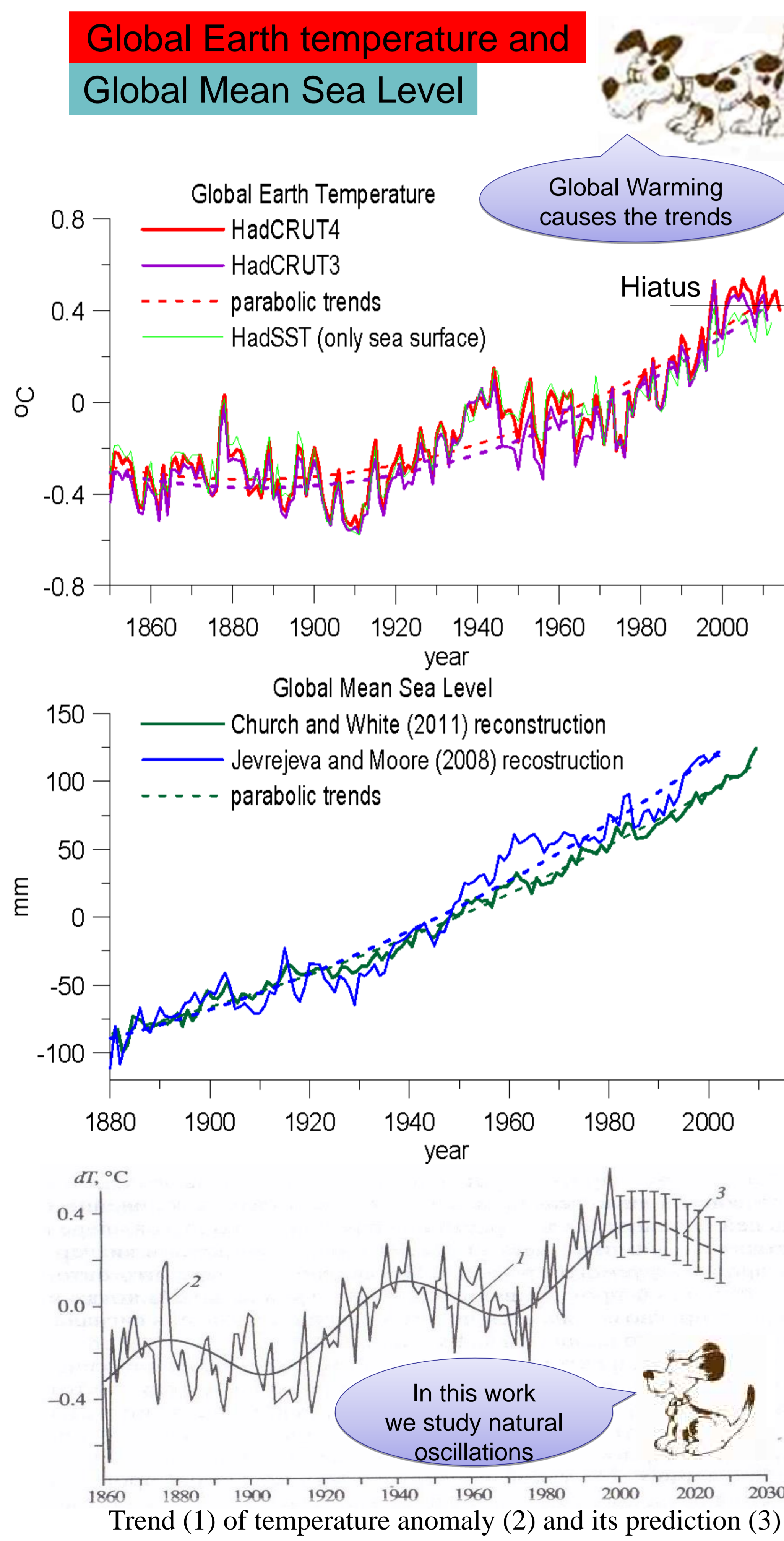
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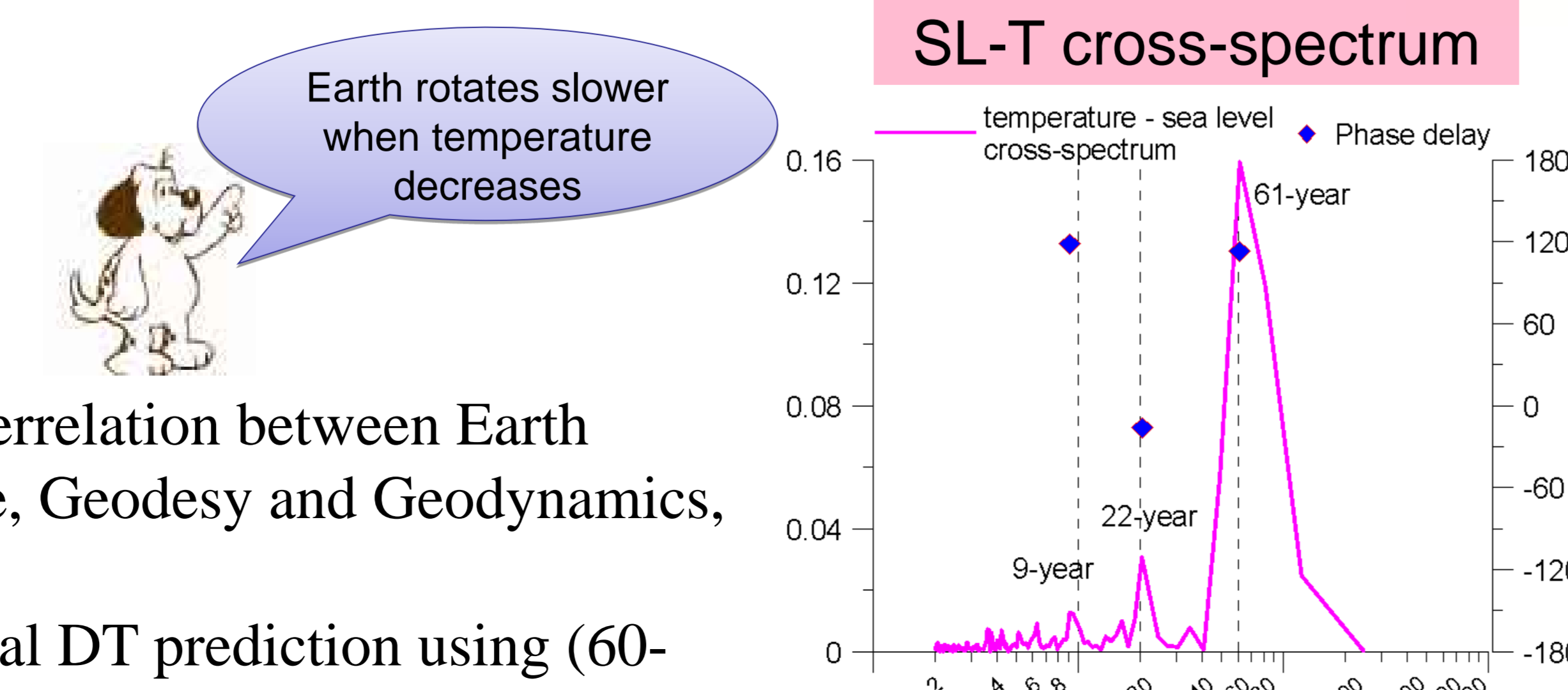
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Abstract: Analysis of the Global Mean Sea Level (GMSL) and Global Average Earth Temperature (HadCRUT4) reveals presence of quasi-periodic components with periods of ~ 60, 20 and 10 years. 60-year component of temperature changes is correlated with the secular changes in the Earth rotation velocity represented by length of the day (LOD) while GMSL is correlated with the amplitude of the Chandler wobble (ChW) of the Earth's pole. We speculate that Hiatus and deceleration of the Global Warming, observed in 2010th, are related to the deceleration of the Earth rotation and Chandler wobble amplitude decrease. The mechanism is not yet explained, but it may involve Atlantic Multidecadal Oscillation (AMO), responsible for 60-year changes in temperature, North Atlantic Oscillation (NAO), which forces AMO, brings wet and cold summer to Northern Europe and drafts to Mediterranean (2017 yr), El Nino (ENSO), and, possibly, astronomical factors, such as 18.6-year cycle of the Moon orbital nodes regression.



Chandler wobble amplitude NLSM fit			
	Period, years	Amplitude, mas	Phase (1880)
~80-year component	83.44	42.6	40.8°
~40-year component	42.0	54.6	-101.5°
mean		134.8	



Conclusion: Climate change and Earth rotation seems to be interrelated. Besides Global Warming trends there are quasi-periodic components of 60, 20, 10-year periods in temperature and sea level. 60-year component of Earth rotation rate (inverted LOD) matches temperature changes. Amplitude modulation of the Chandler wobble includes ~40 and ~80-year components, the latter correlates with the oscillation of sea level. Similar fingerprints in climate and Earth rotation could be produced by the changes of circulation in the ocean and atmosphere (AMO, NAO) or by external factor, for example moon orbital nodes regression (18.6 yr).

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Reference:

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