

Mathematics and Climate

Alex Albors Juez

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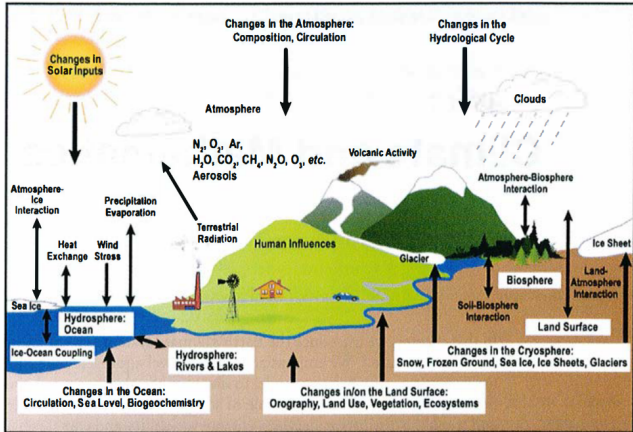


Figure: Earth's climate system

Orbital Parameters in Milankovitch Cycles

- 1 Eccentricity E : 0.0034 - 0.058
- 2 Obliquity T : Between 22° and 24.5° .
- 3 Precession P , Precession index = $E \cdot \sin(P)$

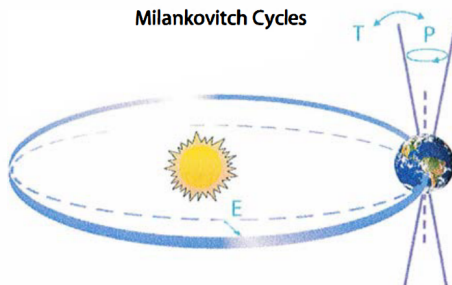
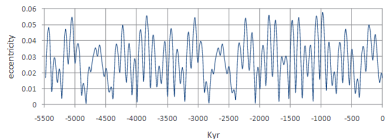
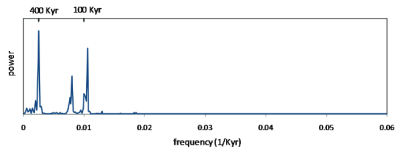


Figure: Schematic view of orbital parameters

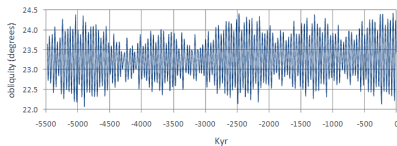
Orbital Parameters



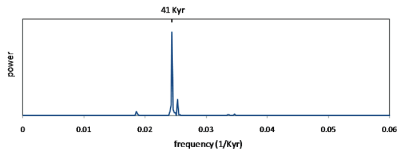
(a) Eccentricity



(b) Power Spectrum

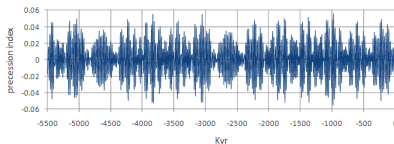


(a) Obliquity

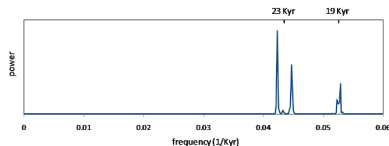


(b) Power Spectrum

Power Spectrum



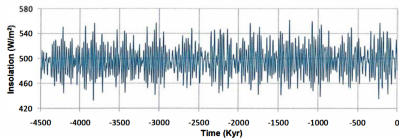
(a) Precession index



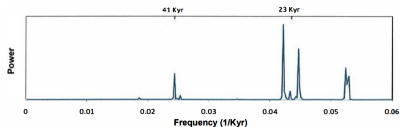
(b) Power Spectrum

- 1 Eccentricity shows two peaks of period 400Kyr and 100Kyr
- 2 Obliquity at 41Kyr
- 3 Precession index has main periods of 23Kyr and 19Kyr

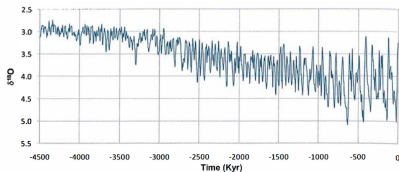
Ocean Sediment Core Samples



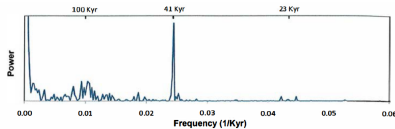
(a) Average daily insolation at 65°N



(b) Power Spectrum



(a) Climate Variance



(b) Power Spectrum