

Caldera – Large volcanic dome basin – filled with water = caldera lake

10-1

CLIMATE CHANGE and GEOMORPHOLOGY

CO₂ & Climate – Complex Causes

Plates, tectonism, weathering, CO₂ bio, ocean arc

CO₂ – major control (decline)

Eocene & Miocene – 700 pp mv - parts per milli (double present)

Rock debris weathered - consumes CO₂

Decrease in CO₂ cools

Dissociation of $\text{CaSiO}_2 + \text{CO}_2 + \text{H}_2\text{O} \dots 2\text{HCO}_3 + \text{CA} + 2\text{HCO}_3 -$
– $\text{CaCO}_3 + \text{H}_2\text{O} + \text{CO}_2$

Weathering doubles with 10C increase Temp

Marine { deep water limestone organisms – subducted
shallow water limestone organisms less frequent.

Land { Miocene age of mammals – lush grass and grazers
Plant and leaf shredders (browsers)

Ocean Arc – Surface & vertical thermo cline

Temp correlations by O₂ isotopes pelagic & benthic

(Unstable O₁₈)+(O₁₆ (stable) SMOW (standard ocean water)(standard x ocean water)

Climate Process precession (Earth motions – precession of orbit)

Milankovich Theory – Mild winter & cool summer produce snow

(variation of solar energy)

Tertiary - Tectonism caused pulling of mud sea & landscape change

Quaternary – Greenland / Iceland – closure of Panama Isthmus

Glaciation & glacial sands

3.1 – 2.4 mi yr ago

30% of land covered & uncovered during past 1.3 m/y

Europe & N A landforms are glacial loess dates to pleistocene time.

Ice sheets lowered sea level

Non-analog Climates – boreal forest to 10 degrees of North Pole

No freeze in Alaska above Arctic Circle to 70 N – How did plants/trees survive in

Sub tropics in Nantucket & glaciers

Dry climate – Aw & As ; BW & BS

Koeppen 10 inch level – of rainfall

Thornthwaite – evapo-transpiration - temp & daylight

Meigs –

Steppe vs. desert, prairie, veldt & pampas, loess

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