

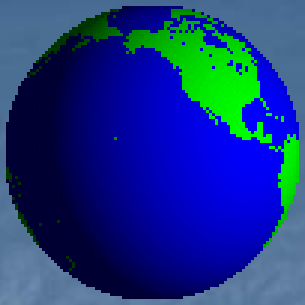


What is

Physical

Geology

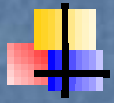
all about?



Physical Geology examines the ...



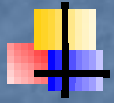
Earth materials,



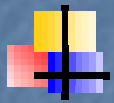
Earth processes,



Earth's surface morphology,



Earth's internal structure,



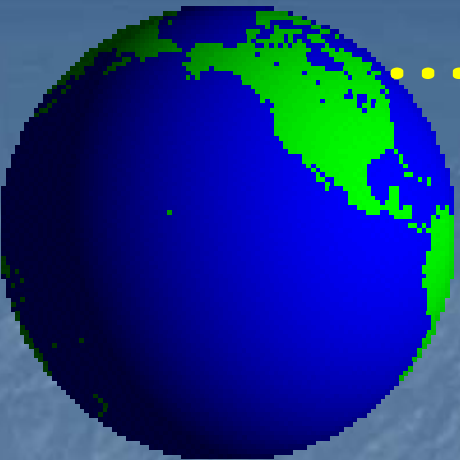
Earth evolution,



Earth resources and



Earth environment.



... so as to understand
and solve the problems
related to ...



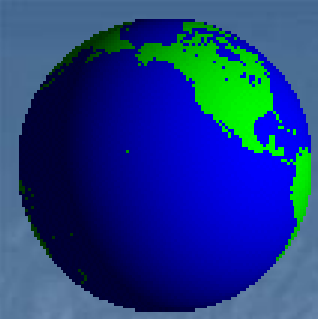
Earth hazards, e.g.,
earthquakes, volcanism,
tsunamis etc.



Earth environment, e.g.,
global warming, climate change,
floods, hurricanes, aridity etc.,
and



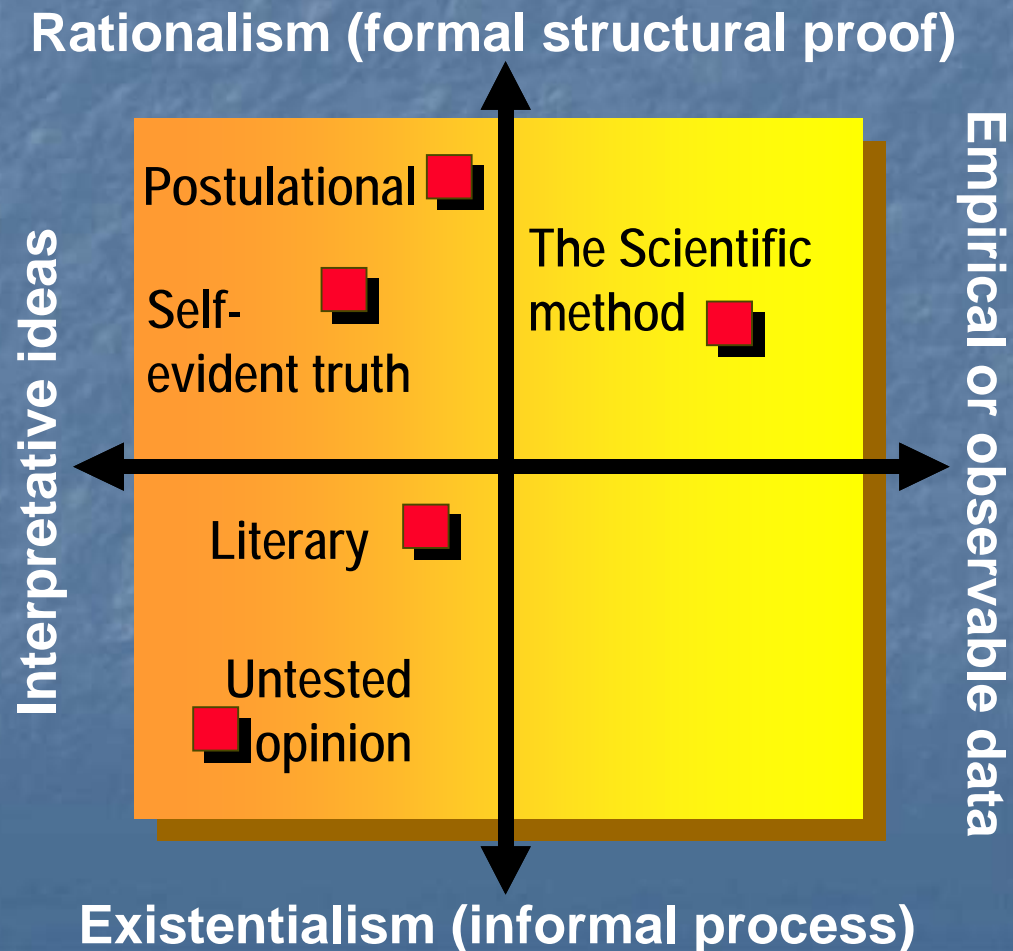
Earth resources, e.g., the impen-
ding energy crisis.

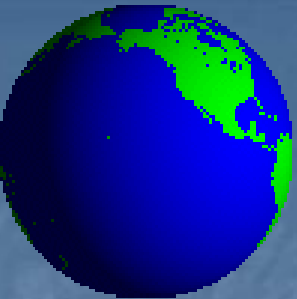


Science is a continuous quest for the basic rules that apply equally all over the universe.

No proposal or idea is scientific, therefore, unless it is amenable to falsification.

But the experimentation often needed for such a quest is seldom available in the geological sciences.





How does geology solve this problem?



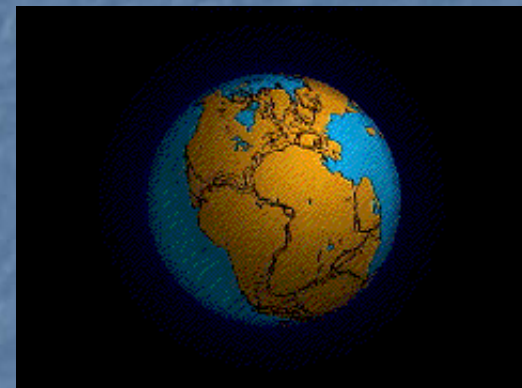
Distinguish law from postulate and theory.



Linearize, e.g., using the radiometric decay principle to date geological past.

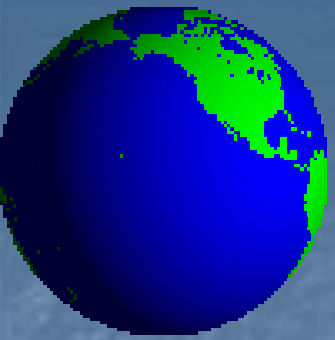


Seek independent evidences, e.g., gravity, seismicity and geomagnetism to map earth's internal structure.



Earth, the “Third Rock from Sun” is also called the “Lonely Planet” because, to our knowledge as yet, earth is the only planet with evidence of life and it is water that creates this uniqueness.





This uniqueness comes from two cycles that define the Earth ...



hydrological cycle;

and

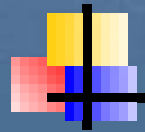
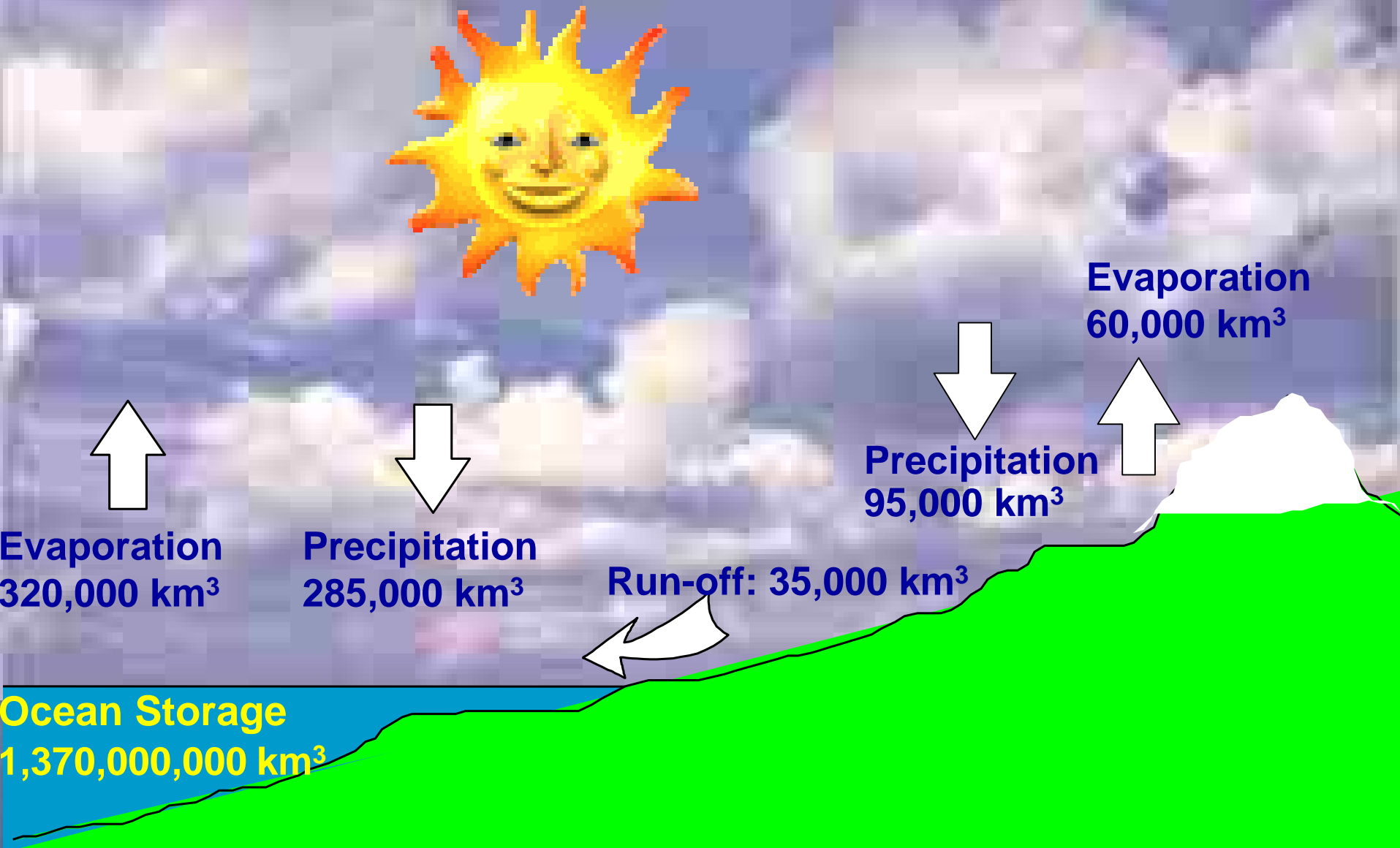
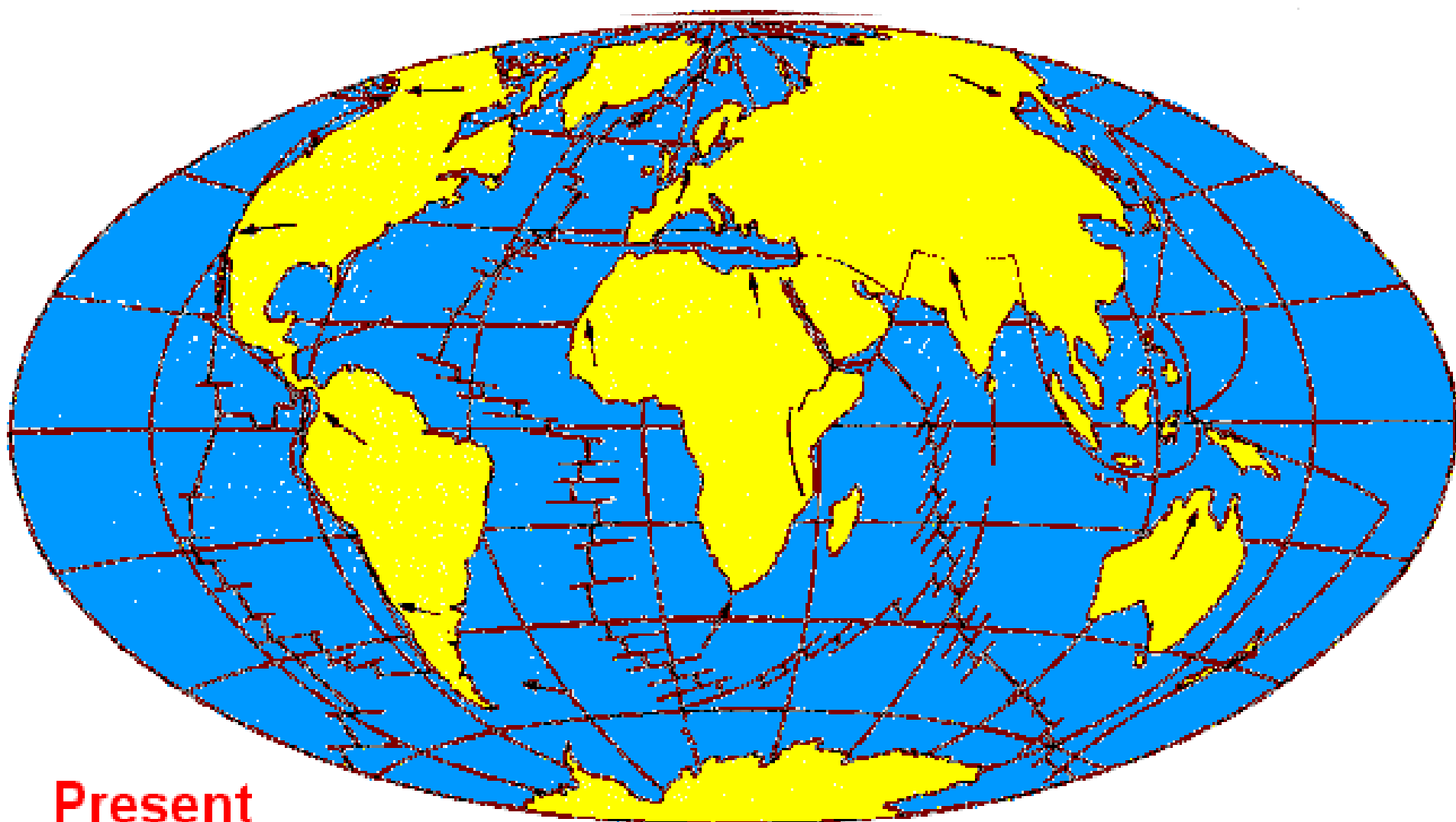


plate tectonics.



A conceptual look at the hydrological cycle



Present

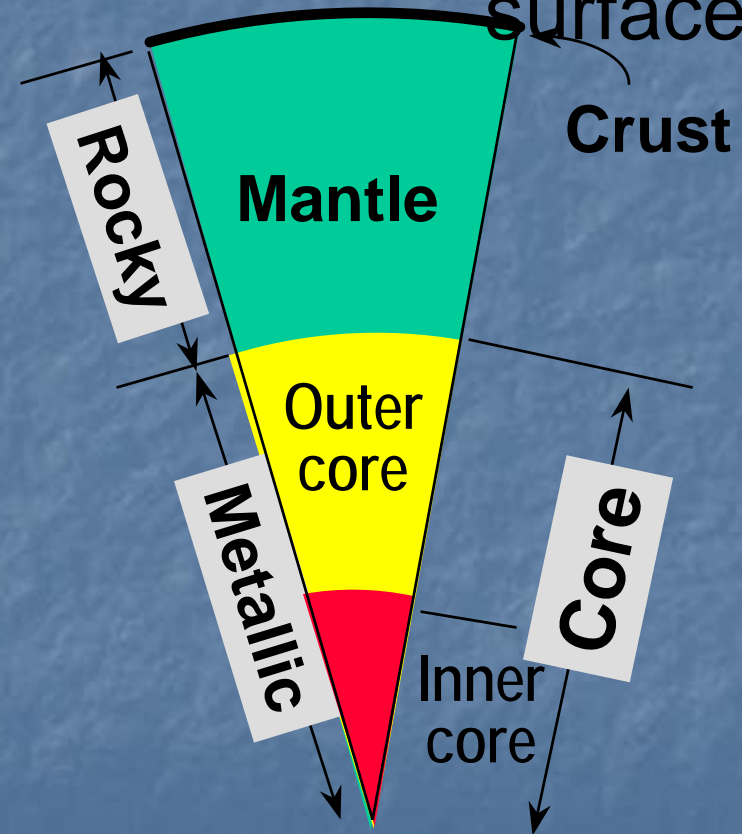
Universe			Whole Earth	Earth's Crust
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Hydrogen	H	74.500		
Helium	He	23.840		

Oxygen	O	0.8200	29.8	46.6
Carbon	C	0.3750		
Nitrogen	N	0.0910		

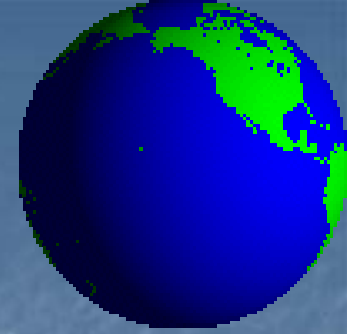
Silicon	Si	0.0830	15.6	27.7
Neon	Ne	0.0550		
Magnesium	Mg	0.0570	13.9	2.1
Iron	Fe	0.1040	33.3	5.0
Sulphur	S	0.0380		
Aluminum	Al	0.0066	1.5	8.1
Calcium	Ca	0.0074	1.8	3.6
Nickel	Ni	0.0092	2.0	
Sodium	Na	0.0033	0.2	2.8
Argon	Ar	0.0030		
Chromium	Cr	0.0032		
Phosphorous	P	0.0009		
Manganese	Mn	0.0011		
Chlorine	Cl	0.0006		
Potassium	K	0.0003		2.6
Other elements			1.9	1.5

The whole earth is richer in Fe, Mg and Ni, and poorer in Si, K and Al, than what is found on the earth's surface.



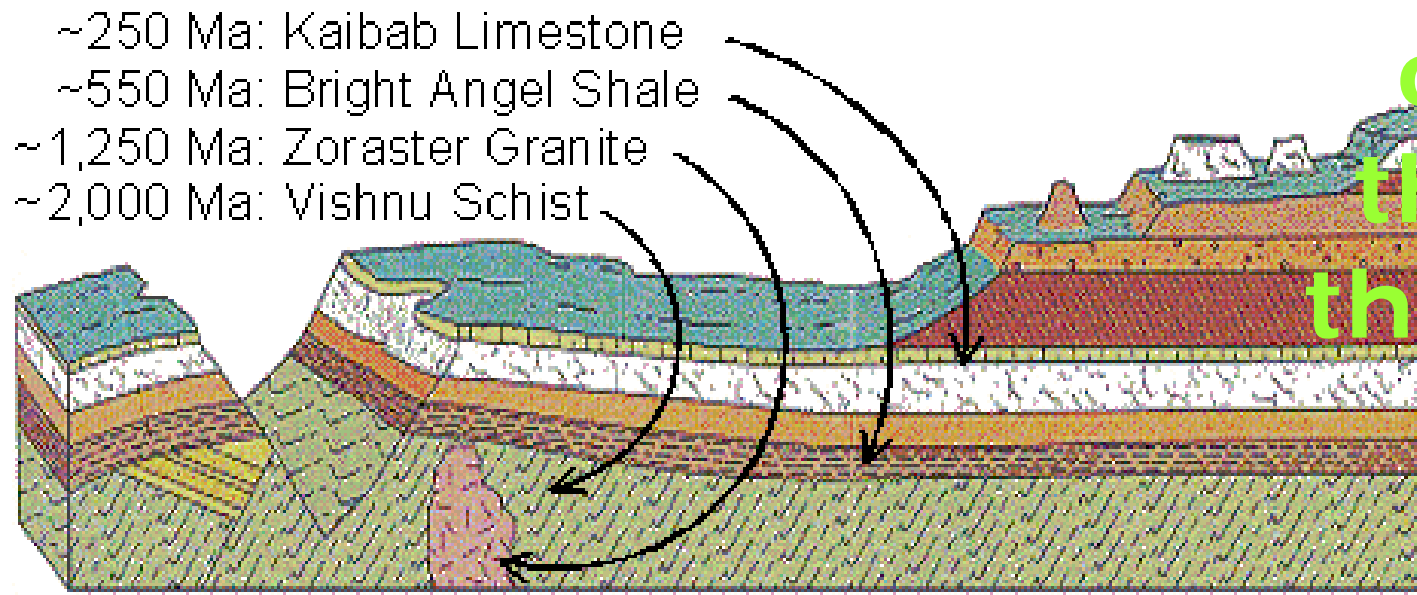
Whole Earth density = 5.5 gm/cm^3
 Density of the crust = 2.7 gm/cm^3

The principle of superposition of strata:



In an undisturbed succession of layers, the one at the bottom is the oldest.

~250 Ma: Kaibab Limestone
~550 Ma: Bright Angel Shale
~1,250 Ma: Zoroaster Granite
~2,000 Ma: Vishnu Schist





Mount Annapoorna, 26,545 ft (8,091 m)

Present is the key to the past,
i.e., the geological processes
today are the same as they have
always been.



Bibi ka Makbara, Aurangabad

