12.001 Lecture notes: Geological Time

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Geological timescales provide a framework for deciphering the history of the Earth.

The geological time is measured in relative time and absolute time

1.) The international stratigraphic divisions and their correlation in the global record. Only the Phanerozoic can be subdivided based on stratigraphy and the global correlation of appearance or disappearance of fossils (biostratigraphy). In contrast, the Precambrian (Proterozoic and Archean) are formally classified chronometrically (i.e. in terms of absolute radiometric dates). The absolute timescale is subdivided into eons, eras, periods, epochs and stages.

2.) Absolute dating: Radiometric age data and astronomical cycles

Calibration of the stratigraphic to the linear time scale is a matter of discovery and estimation. Show figure of Gradstein of Arthur Holmes and explain the importance of error in geological studies. Show figure 1.5 and explain that the calibration is ongoing and changes can be quite significant.

Essentially you have to learn in this class the relative time scales and we hand out a version. You will have to know the age date of all Periods in the Phanerozoic, and the eon for the Precambrian.

Absolute ages

Explain Concordia and zircon U-Pb sustematics

If we have a significant amount of D originally in the mineral we have to use a different method: the isochron method.

As we don't know a priori how much D_0 we have, we need measure more than one type of mineral.

Explain isochron method

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