

An approach of converting geological time by stacking string content

Tobias Stål

April 26, 2019

Abstract

Some geological databases list geochronological age in the units of geological time. This makes comparison and automated sorting challenging. This code converts geological time to age in years. The output can be a number, a range, a minimum or maximum age, given uncertainties in dating method and definitions of geological periods. The package is written in Python and also contains methods for generating geological time from age in years and producing various computer readable formats of the International Chronostratigraphic Chart. Methods also returns defined colours that might be used to e.g. improve ternary plots.

1 Introduction

Converting age a geological time to age in million years proved to be difficult. Existing projects, as

[?]
[?]
[?]

2 Discussion and considerations

Geological time is more than just a definition of age.

3 Methods

The International Chronostratigraphic Chart is converted to computer readable formats as JSON, XML and csv. The concept here, is not to repeat the detailed and informative structure of [?], but only to provide the computer with a list of chronostratigraphic units. The units form an array, with time as rows and finer subdivisions as columns. This is in perfect analogy with the International Chronostratigraphic Chart, and is easily readable be humans as well. Colour codes are stored in an additional dimension.

3.1 chronostratigraphic description to age

Text defining geological age is read to a string that is split into words. The code generates an array containing logical comparisons for each word in the input string. Each comparison happens only once, and starts from larger subdivisions and moves to finer.

Upper Jurassic Adds all fields 'upper' with all field in Jurassic. As all words are used, the algorithm stops. and returns the highest stacked value:

if a word is left, eg:

upper upper Jurassic, the remains are compared with lists and further refines the age.

The dictionary contains a number of values e.g:

upper = 0.75 uppermost = 0.99 early = 0.25 earliest = 0.01 mid = 0.5

The user gets three options: Return a range as a tuple Return a normalized value, the center of the range Return a normalised value and a +/- value Return a stretched normalised value +/-, this includes uncertainties in definition of geological period as well as uncertainties in data, given as a scalar.

3.2 Age to chronostratigraphic unit

Returns a dictionary with eon period: etc if return string is True, the dict is expressed as a string.

3.3 Age to colour

Input is a number or geological string. If the later, the method strao to age is used to convert it. The age is read from table.