DISCUSSING THE AGE OF UNKNOWN AGE EVENTS

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Events of unknown ages have by definition no known age. However our knowledge on these unknown ages is not completely nonexistent, since these events can be inserted in an ordered set of events of known ages (dated by radioisotopic methods for example) and of events of unknown ages. Our knowledge on such ordered sequences can be formalized by using the noninformative (uniform) prior probability density distributions for the ages of events of unknown ages and Bayes’s theorem to introduce the time-order relationship condition. We deduce that the posterior (conditional) density probability distributions of the ages of events of unknown ages are given by various forms of Euler’s beta distribution. These distributions allow us to estimate the probability for an event of unknown age to occur at a given time interval.

As an exemple we build appropriate probabilistic images which allow us to express our actual knowledge/ignorance on the ages of reversals of the Earth’s magnetic field from the Middle Miocene to the Upper Pliocene. These images take into account the uncertainties which arise from the non-regularity of oceanic spreading rates and the uncertainties in absolute calibration points. The ambiguity which exists in the polarity state of the geomagnetic field at a given time can be estimated using the Entropy function.

This bayesian approach should be considered when an "unknown" age event can be inserted within a ordered serie of events.