

# Time series reconstruction of environmental proxy records.

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Proxies are sources of climate information which are stored in natural archives. Since climate models are matched to proxies, proxies need to be as precise and as accurate as possible; otherwise the models, as well as the conclusions drawn, will be biased. In other words, the proxy data need to be treated in order to eliminate possible errors. This thesis focuses on in the preprocessing step of proxy data. Three problems are addressed here:

Problem 1: Growth anomaly. Each data record therefore has its unique non-constant accretion rate and thus its own nonlinear distance–time relationship. Natural archives are sampled on a distance grid along their accretion axis. Starting from these distance series, a time series needs to be constructed, as comparison of different data records is only meaningful on a time grid.

Problem 2: Averaging. A typical example of sampling solid substrates, is drilling. As a result of the dimensions of the drill, the holes drilled will not be infinitesimally small. Consequently, samples are not taken at a point in distance, but rather over a volume in distance. This holds for most sampling methods in solid substrates. Thus, when the continuous proxy signal is sampled, it will be averaged over the volume of the sample(Goodwin et al., 2003)(Goodwin et al., 2003)(Goodwin et al., 2003)(Goodwin et al., 2003)(Goodwin et al., 2003)(Goodwin et al., 2003)(Goodwin et al., 2003).

Problem 3: Discretization errors. Some discretization errors will be present in the measured proxy record. This means that the real maxima and minima might not be measured, because only a limited number of samples are taken.