Age models within the OC3 database: Summary of breakout group discussion.

Some initial questions:

1) Do we need / want to develop a consistent approach for assigning calendar ages to entries within the OC3 database?

2) Do we have the resources to do such a thing?

3) What information do we insist on for reporting age constraints?

4) Do we have a set of criteria for assessing age model approaches and results?

5) OC3 age modelling product?

An attempt to pull our discussion together to address these (please blame S. Barker for any misrepresentation of other individual group member views):

1) The wide range of approaches currently employed to generate chronologies for marine records (let alone future developments), together with differing opinions as to their relative merits, and the fact that different approaches will be more or less suitable depending on the site location and interval, means it is not clear that any single approach can or should be recommended as the optimal.

2) Furthermore, given the limited resources of our working group it seems most appropriate at this stage not to limit the inclusion of datasets to those with some specified set of chronological constraints (i.e. we do not want to exclude datasets). Previously published chronologies should be included within the OC3 database but we should ensure that reporting of chronological constraints (age control points, age modelling approach employed, appropriate uncertainties) is adequate to allow future refinement and modification. As an evolving database we should expect that various users will want to employ new and 'improved' approaches to age modelling and this should be a central concern in our reporting requirements.

3) In terms of reporting, a distinction should be made between age control points and the resultant chronology (in calendar years b1950). The latter would be included within the main table for each core and would include information on the age modelling strategy adopted (linear interpolation, spline fitting, Bayesian approach etc). It would also include an additional column for uncertainties where these are available (with the uncertainty distribution and method of estimation described). In addition, a separate table with the calendar age control points used for developing chronologies should be provided. The format of this table could depend on the nature of the control points (e.g. radiometric, stratigraphic) or perhaps a generic table is needed so that multiple control point types can be incorporated. Alternatively control points could be incorporated within the main table but distinguished from the resultant chronology (which may not pass through specific control points when certain Bayesian methods are used). In each case the nature of the control point needs to be described in full.

For example, for stratigraphic alignment techniques the target curve and timescale must be identified and some rationale for the alignment given or cited. Quoted uncertainties might incorporate the width of the transition (in depth or time) in both the subject and target curves. To allow future assessment of stratigraphic approaches it would be valuable to include the subject curve (e.g. benthic or planktic $\delta^{18}O$, planktic ^{14}C age in the case of plateau tuning) within the main database. In the case of radiometric approaches all of the information required to get from individual age measurements to the resultant chronology must be reported (e.g. for traditional ^{14}C dating: depth in core, species used, sample weight, accession number, uncorrected conventional ^{14}C age and error, reservoir age and uncertainty and basis for choice of R, calibration curve and software used).

**NB I have categorised ^{14}C plateau tuning as a stratigraphic approach because it generates age control points by alignment with a target curve but it could also be considered as a radiometric technique

4) Currently we do not have a set of criteria that can be used to assess the quality of age modelling techniques but this could be a goal of a sub-OC3 working group.

5) We will consider organising a work-package aimed specifically at comparing different approaches for age model development with the aim of reaching a consensus on which approaches are most appropriate for various locations and intervals or alternatives where other constraints are present (such as material availability). This might not be possible but it would make for a very interesting study at least.