FOSSIL-WOOD CARBON-ISOTOPE
STRATIGRAPHY OF THE NON-MARINE
WEALDEN GROUP (LOWER CRETACEOUS,
SOUTHERN ENGLAND)

S.A. Robinson (1), S.P. Hesselbo (2)
(1) Lamont-Doherty Earth Observatory of Columbia University, (2) Dept of Earth Sciences,
University of Oxford (stuartr@ldeo.columbia.edu)

Recent studies have shown that it is possible to use the carbon-isotopic composition of fossil wood as a chemostratigraphic tool and as a proxy for changes to the carbon-isotopic composition of palaeoatmospheres. We present new fossil-wood carbon-isotope data from the non-marine Wessex Formation (Wealden Group, Lower Cretaceous) of the Isle of Wight and Dorset (southern England). These carbon-isotope data have values ($\delta^{13}C \sim -26.6$ to $-19.8$ per mil) that are consistent with those expected for Mesozoic C$_3$ plants. By combining our data from the Wessex Formation on the Isle of Wight with previously published data from the overlying Vectis Formation and Lower Greensand Group, it has been possible to correlate a broad positive excursion in the fossil-wood data with a similar feature in a Barremian-Aptian marine carbon-isotope record. This correlation suggests that the exposed Wessex Formation on the Isle of Wight is almost entirely lower Barremian in age, as has been previously suggested by palynological studies. Consideration of the Isle of Wight fossil-wood carbon-isotope data together with data from Dorset allows construction of a composite fossil-wood carbon-isotope curve for almost the entire Wealden Group. This curve is tentatively correlated with a Tethyan reference carbon-isotope curve, thereby allowing the provisional application of stage-level chronostratigraphy to the Wealden Group. On the basis of these correlations, it appears that the Wessex Formation is mainly Hauterivian-Barremian in age. The correlations further suggest that the Valanginian in Dorset may be condensed or partially missing, as has been proposed by regional seismic and borehole studies. The carbon-isotope data presented here indicate that even
during times of relative carbon-cycle quiescence atmospheric CO$_2$ faithfully tracks the carbon-isotopic composition of the oceanic reservoir.