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Carbon Isotope Stratigraphy of the Triassic-Jurassic Boundary, Northern Calcareous Alps, Southern Bavaria.

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The end Triassic is recognized as a period of increased marine biotic turnover, culminating in one of the five major mass extinction events of the Phanerozoic at the Triassic-Jurassic boundary. Carbon isotope excursions have been reported globally that may be in response to a perturbation to the earth system. Here we present findings from a succession of early Mesozoic Tethyan carbonate strata from the Northern Calcareous Alps (NCA) of southern Bavaria, Germany. The succession ranges from Carnian to Middle Jurassic in age and is part of the Bavarian Syncline, which trends East-West along the northern extent of the NCA. The two field areas studied, Wallberg and Buchstein, contain the Tr-J boundary, which is marked by an abrupt change from underlying reefal carbonate rocks to a deeper basinal setting dominated by marls, as well as the disappearance of abundant brachiopod, bivalve and colonial coral populations. The boundary is also characterized by a carbonate carbon isotope excursion. Carbonate C isotope values in the underlying reefal carbonate rocks are marked by values of 2.0 to 2.5‰Àbove the contact, the carbonate C isotopes show a 1.5 – 2.0‰ decline, which coincides with the change from shallow to deeper marine carbonate sedimentation. Following the excursion, and whilst the succession maintains a basinal palaeoenvironmental setting, the C isotopes return to values similar to those present beneath the Tr-J boundary ranging from 2.0 – 2.5‰ÌThe negative excursion may be recording a global perturbation to the carbon cycle, however the change from a shallow to deep marine depositional environment must also be considered as a possible influence on isotopic composition. Cross-plots of C and O isotopes show no correlation hence we prefer to interpret the carbonate C isotopic data to record original seawater values. Post-depositional diagenetic and lithification processes, however, likely modified the O isotope values. Our results urge caution in identifying C isotopic excursions as global until potential palaeoenvironmental-related changes can be excluded.