Revised age constraints for Late Cretaceous to early Paleocene strata from the Dawson Creek section, Big Bend National Park, west Texas

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The Dawson Creek section within Big Bend National Park, Texas documents a series of Upper Cretaceous though lower Paleocene alluvial deposits that accumulated along a passive continental margin within the Tornillo Basin of west Texas. The Cretaceous dinosaur faunas from the Dawson Creek area are key for understanding regional patterns in dinosaur community diversity and biostratigraphy. Additionally, analyses of paleosols at the Dawson Creek section have been used to argue for two short-lived greenhouse events during the Maastrichtian (NORDT et al., 2003; DWORKIN et al., 2005). Despite the importance of Dawson Creek record for understanding Cretaceous and Paleocene paleoclimate and the composition of vertebrate communities, the absolute age and duration of the Upper Cretaceous Aguja and Javelina Formations and Paleocene Black Peaks Formation are relatively poorly constrained.

In this study, we develop a precise chronostratigraphic framework for the Dawson Creek section using magnetostratigraphy, detrital sanidine geochronology, and biostratigraphy based on a reevaluation of the vertebrate fauna. The documented polarity zones can be correlated to C32n–C31n, C29r, and C27r of the geomagnetic polarity time scale (GPTS) with three hiatuses spanning more than 1 Ma each. Rock magnetic analyses indicate that the dominant magnetic carrier in the Aguja and Black Peaks formations is titanomagnetite while the Javelina Formation has varying magnetic carriers including hematite, magnetite, and oxidized magnetite. An overprint interval surrounding the K-Pg boundary suggests the primary magnetic carrier, titanohematite, was likely reset by burial and/or overlying basaltic flows. Our age model shows that the dinosaur fauna found in the section are Maastrichtian and restricted to C29r. This is the first independent age model for the Cretaceous-Paleocene strata at the Dawson Creek section that determines the age and duration of deposition of each formation in the section, as well as the age and duration of multiple unconformities through the succession. As a result, this age model can be used to reassess biostratigraphic and isotopic correlations between the Big Bend area and other Cretaceous-Paleogene (K-Pg) basins across North America.

NORDT, L. et al., 2003, GSA Today, **13**, 4–9.
DWORKIN, S. et al., 2005, EPSL, **237**, 56–68.