The Cretaceous Period was punctuated by a series of perturbations of the global carbon cycle that culminated in the installation of oceanic anoxia and affected marine ecosystems (Schlanger and Jenkyns, 1976; Weisert et al., 1998; Erba, 2004; Weisert and Erba, 2004). One of these oceanic anoxic events (OAE), the OAE3, developed during the Coniacian to early Campanian time period and lasted for almost 5 Myr, although its extent is regional compared to other OAEs, such as the OAE2 at the Cenomanian–Turonian boundary (Wagner et al., 2004; Locklair et al., 2011; Wagreich, 2012). The OAE3 is depicted by a series of 5 short-amplitude, high-frequency positive peaks in the evolution of carbon stable isotope (δ13C; Wagreich, 2009). During this part of the Late Cretaceous, the epicontinental Western Interior Seaway covered central Texas, resulting in the deposition of a thick series of fine-grained carbonate sediments known as the Austin Chalk. Despite a relatively well-constrained biostratigraphic framework (e.g., Young, 1963; Pessagno, 1969; Jiang, 1989; Lundquist, 2000), the Austin Chalk lacks a robust integrated stratigraphic framework in which the impact of the aforementioned paleoenvironmental crisis as well as more local parameters (e.g., local submarine topography, nutrient and detrital input) on carbonate bio- and lithofacies could be assessed. ...
Integrated Stratigraphy of the Austin Chalk Group across the San Marcos Arch, South-Central Texas
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Study Area

Outcrop Correlation
Composite stratigraphic column of Austin Chalk in Bexar County

Outcrop example of the upper part of the Austin Chalk

Longhorn Quarry

Stratigraphic Columns

Regional Cross Section

Microfacies

Objectives
- Build a sequence stratigraphic framework of the Austin Chalk across the San Marcos Arch by integrating outcrop and subsurface data
- Identify regional changes in thickness and facies by comparing gamma ray log response between outcrop and subsurface data while integrating litho- and sequence stratigraphic relationships observed in outcrop

Background
- The Austin Chalk Group spans the Late Cretaceous and early Tertiary
- Several intraformational discontinuities within the Austin Chalk, most commonly recognized as broken horizons, contribute to subtle truncation of stratigraphic units in south-central Texas and have regional correlative potential from outcrop to subsurface

Study Area

Outcrop Location Map

Outcrop example of the upper part of the Austin Chalk

The Outcrop example of the upper part of the Austin Chalk shows a section of the Austin Chalk where it is exposed at the surface. The Austin Chalk is a prominent unit in the geology of the region, and its thickness and facies can be observed in outcrop.

Stratigraphic Columns

Regional Cross Section

Microfacies

The Burdett and Pflugerville formations pinch out to the southwest over the San Marcos Arch and an overall thinning of each formation within the Austin Chalk Group is observed. The Josephine Limestone also appears to thin across the San Marcos Arch and eventually pinches out entirely into Bexar County further southwest.
Subsurface Correlation: Variations between depositional geometries of the Lower, Middle, & Upper Austin

**Supplemental Outcrops**

**Discussion & Synthesis**
- The Lower Austin consists mainly of the Austin Chalk and Calvert Member. This unit is characterized by a shallower shelf and contains abundant marine life in the shelf environment.
- Previous research on geophysical logging data has highlighted the presence of an expanded Austin Chalk formation in the East Austin area, indicating a shallower shelf environment.
- The Middle Austin consists of a variety of deposits, including the Austin Chalk and Calvert Member. It is characterized by a deeper shelf environment and contains less marine life than the Lower Austin.
- The Upper Austin consists mainly of the Austin Chalk, with a deeper shelf environment and contains abundant marine life and fossils.

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