

Trower et al., 2018, Erosional surfaces in the Upper Cretaceous Castlegate Sandstone (Utah, USA): Sequence boundaries or autogenic scour from backwater hydrodynamics?: *Geology*, <https://doi.org/10.1130/G40273.1>.

DATA REPOSITORY FIGURE CAPTIONS

Figure DR1. Preserved bar clinoform (dashed line) in Crescent Canyon. Heights of bar clinoforms like this example were used to estimate paleo-flow depths, following Mohrig et al. (2000). In particular, we focused on bar clinoforms with fully preserved profiles to avoid underestimating channel depth by measuring partially eroded bar clinoforms. The same estimation method was used by Petter (2010), whose bar height data we also included in our analysis. Confluence scour unit bars are not included in these measurements, as these can be several times mean bankfull flow depth in height (e.g., Best and Ashworth, 1997, Ullah et al., 2015).

Figure DR2. Highly amalgamated Castlegate channel bodies in outcrop in Price Canyon (A) and Tusher Canyon (B, above dashed line).

Figure DR3. Scour surface (dashed line) in Blaze Canyon, where depth of scour is >5 m. Scour depths in the dataset were measured/estimated from outcrops, including this example, and combined with previous observations from outcrops (Pattison, 2010) and measured stratigraphic sections (Van Wagoner, 1995).

Figure DR4. Oyster shell coquina from Sagers Canyon, indicating proximity to the paleo-shoreline.

Figure DR5. Symmetrical wave ripples near Sulfur Canyon, indicative of a shallow marine environment. Pens for scale in both images.

DATA REPOSITORY REFERENCES

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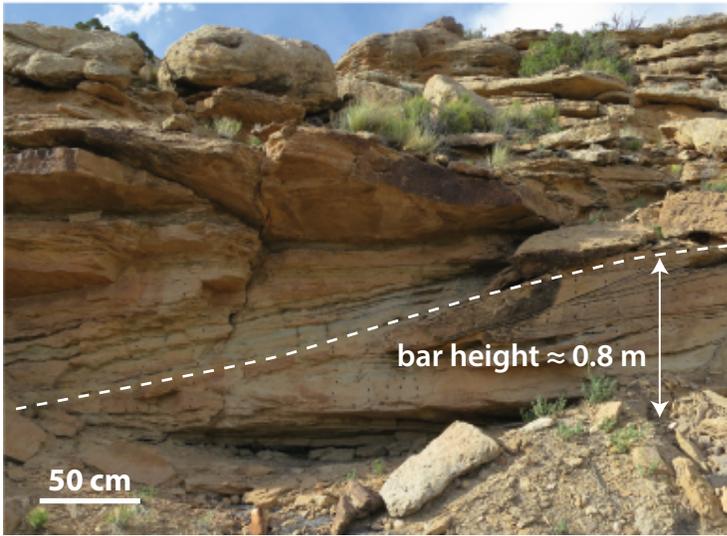


Fig. DR1

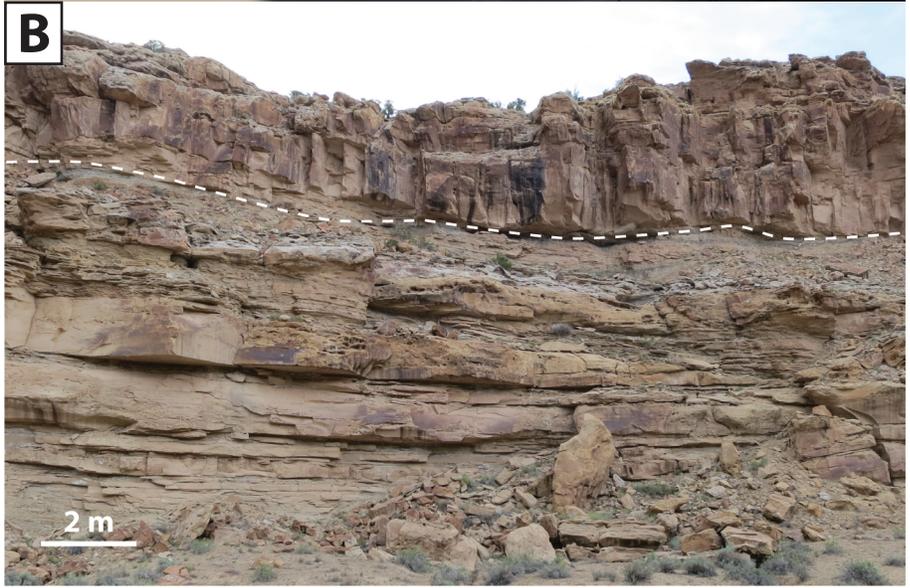


Fig. DR2



Fig. DR3

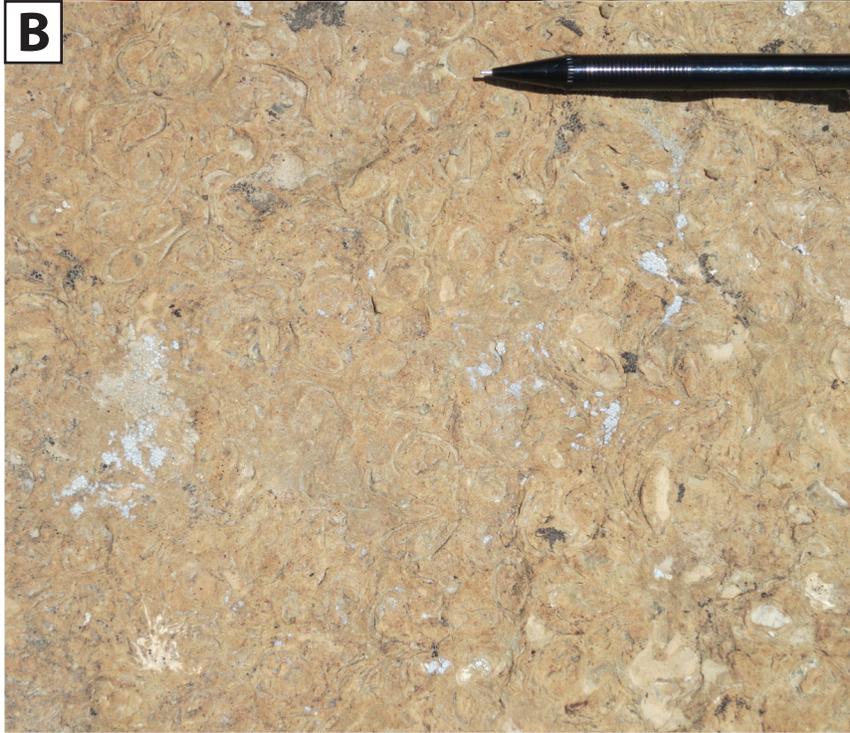


Fig. DR4



Fig. DR5

SUPPLEMENTARY TABLE DR1. CASTLEGATE BAR HEIGHT, GRAIN SIZE, AND BED SLOPE
DATA

Locality	Mean bar heights (m)*	Grain size ($D_{50,bed}$, μm)*	Bed slope (km)†§	Backwater length (L_b , km)†
Tusher Canyon	3.8 ± 2.2	242	2.34×10^{-4}	16.23
Floy Wash	3.5 ± 2.2	161	2.11×10^{-4}	14.95
Crescent Canyon	4.3 ± 2.0	161	2.11×10^{-4}	18.36
Blaze Canyon/Thompson Canyon	4.8 ± 3.0	139	2.03×10^{-4}	20.50
Salt Wash/Sagers Canyon	5.1 ± 3.6	133	2.01×10^{-4}	21.78
Strychnine Canyon/Horse Pastures	6.0 ± 4.4	140	2.04×10^{-4}	25.62
Mean	3.8^\dagger	163	2.11×10^{-4}	19.57

*Bar height and grain size data from Petter (2010).

†Bed slope and backwater length calculated using bar heights from Tusher Canyon (upstream of backwater reach).

§Bed slopes calculated following Trampush et al. (2014).

SUPPLEMENTARY TABLE DR2. CASTLEGATE SCOUR DEPTH DATA

Locality	Data source	Scour depth (m)	Distance upstream from Horse Pastures (km)
Horse Pastures	Van Wagoner, 1995	7.3	0.0
Strychnine Wash	Van Wagoner, 1995	7.0	5.3
Bull Canyon	Van Wagoner, 1995	8.2	8.2
Bull Canyon	Van Wagoner, 1995	11.1	8.2
Pinto Wash West	Van Wagoner, 1995	11.1	4.4
Sagers Canyon East	Van Wagoner, 1995	4.1	6.6
Sagers Canyon East	Van Wagoner, 1995	6.4	6.6
Sagers Canyon	Pattison, 2010	10	7.2
Sagers Canyon	This study	3	7.2
Sagers Canyon	This study	9	7.2
Short Jeep Trail	Van Wagoner, 1995	4.1	11.4
Sego Canyon 2	Van Wagoner, 1995	2.3	14.4
South Thompson Canyon	Van Wagoner, 1995	4.4	12.7
Thompson Canyon	Van Wagoner, 1995	5.3	14.1
West Blaze	This study	8	18.0
West West Blaze 2	This study	5	18.5
West West Blaze	This study	4	18.5
Crescent Canyon	This study	1.5	21.9
Crescent Canyon	Pattison, 2010	3	21.9
Crescent Canyon	Pattison, 2010	3	21.9
Crescent Canyon	Van Wagoner, 1995	3.5	21.9
Crescent Junction	Van Wagoner, 1995	1.8	23.5
Floy Canyon North	Van Wagoner, 1995	1.5	26.9
Stubb Canyon	Van Wagoner, 1995	2.9	38.6
West Coal Canyon	Van Wagoner, 1995	0.9	42.3
Big Horn Sheep 1	Van Wagoner, 1995	3.5	46.5
Big Horn Sheep 1	Van Wagoner, 1995	2.9	46.5
Big Horn Sheep 2	Van Wagoner, 1995	0.9	46.5
Big Horn Sheep 2	Van Wagoner, 1995	1.2	46.5