Peng, Y., Olariu, C., and Steel, R.J., 2020, Recognizing tide- and wave-dominated compound deltaic clinothems in the rock record: Geology, v. 48, https://doi.org/10.1130/G47767.1

SUPPLEMENTAL MATERIAL

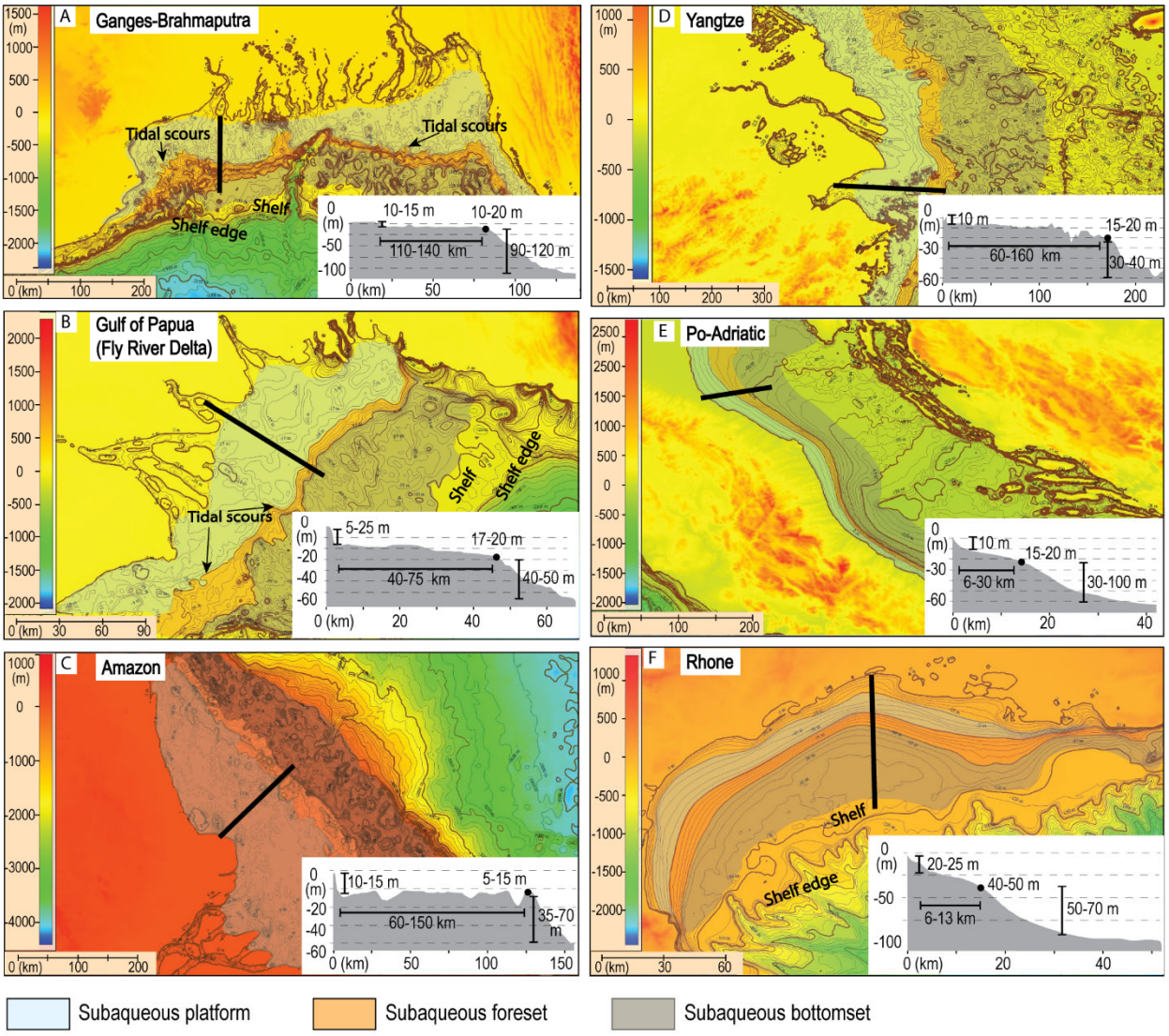

Figure S1. Modern examples of tide-dominated (A-D) and wave-dominated (E-F) compound-clinoform deltas with cross sections showing approximate heights of double clinoforms and water depth of subaqueous rollovers. The rollover points are the points of maximum curvature (or of greatest rate of gradient change). The subaqueous platform and subaqueous bottomset are gentler-dipping surfaces separated by the steeper foreset. The height of shoreline or subaqueous clinoform is the rough relief between the bottomset and topset. Bathymetry data are from the GEBCO_2014 Grid, version 20150318, http://www.gebco.net and plotted in Global Mapper. Note the examples listed here are relatively large compound-clinoform systems, but smaller systems can also have compound-clinoform morphology if the hydrodynamics and sediment supply are appropriate.

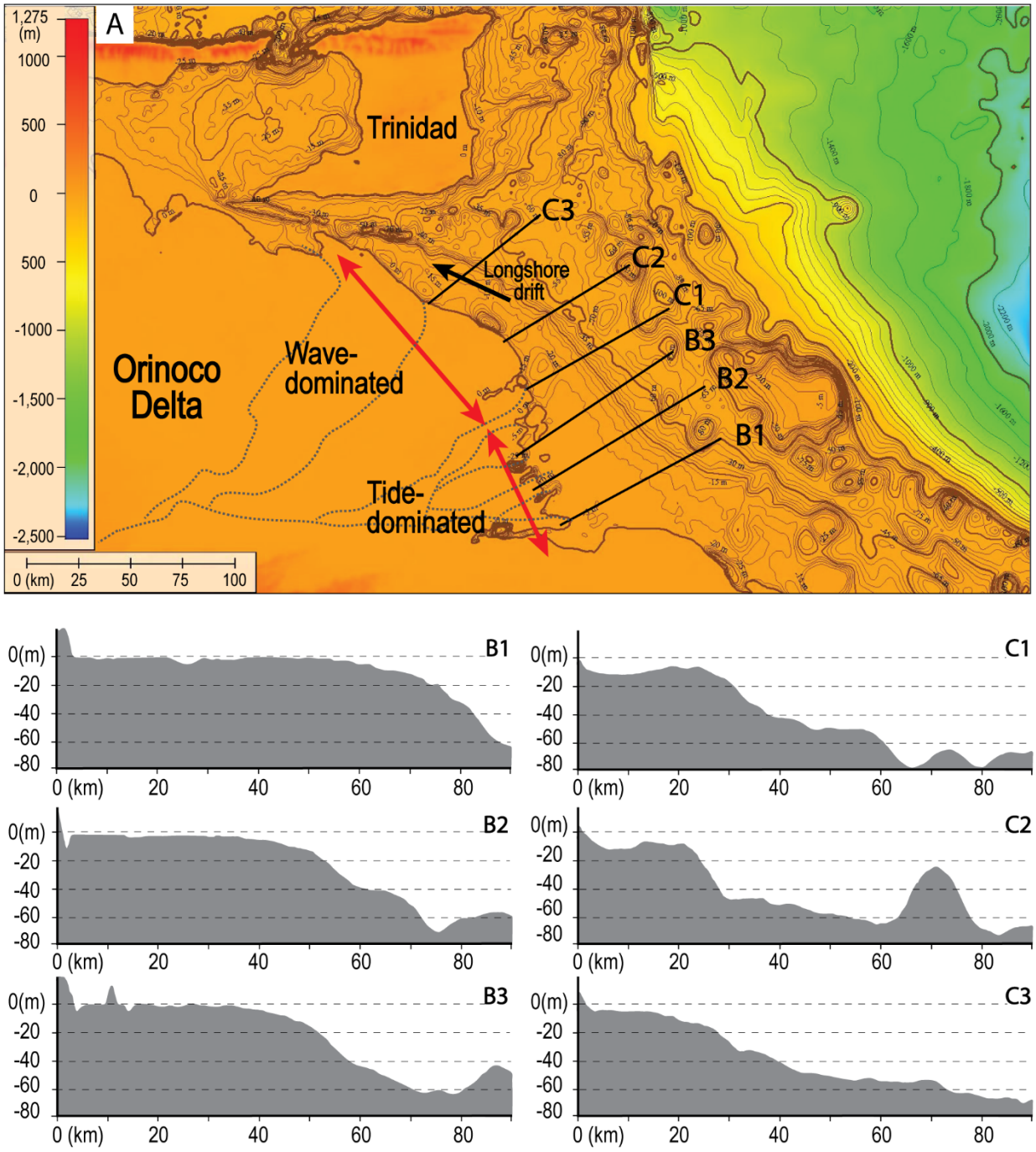

Figure S2. Along-strike changes of clinoform morphology in tide- and wave-dominated segments of the Orinoco Delta. (A) Bathymetry of the Orinoco Delta showing tide- and wave-dominated compound clinoform. (B1-B3) Tide-dominated compound-clinoform delta has wider platform, particularly in front of the river mouth. (C1-C3) Wave-dominated compound-clinoform delta has narrower and deeper platform.

RECOGNIZING TIDE-DOMINATED COMPOUND-CLINOFORM DELTAS IN ROCK RECORD

1. Mophologically it has funnel-shape distributaries and bars in the shoreline clinoform; it displays double rollovers and a wide subaqueous platform (up to 150 km).
2. Two stacked coarsening-upward packages with the subaqueous clinothem (30-100 m thick) is generally 2 to 5 times thicker than the shoreline clinothem (5-30 m thick).
3. The shoreline clinothem is sandier and coarser with stacked sets of river and tidal deposits (e.g., bidirectional crossbedded and rippled sandstones).
4. The platform comprises finer grained but more bi-modal grain-size textures (e.g., bidirectional current-rippled sandstones interbedded with fluid-mud layers) indicating of tidal processes; scour-based HCS/SCS sands with mud clasts occur in places due to large storm waves reworking.
5. The subaqueous foreset is muddy and comprises tidal scours infilled with tidal rhythmites or inclined heterolithics, wave-enhanced sediment-gravity-flow deposits, and fluid-mud deposits.

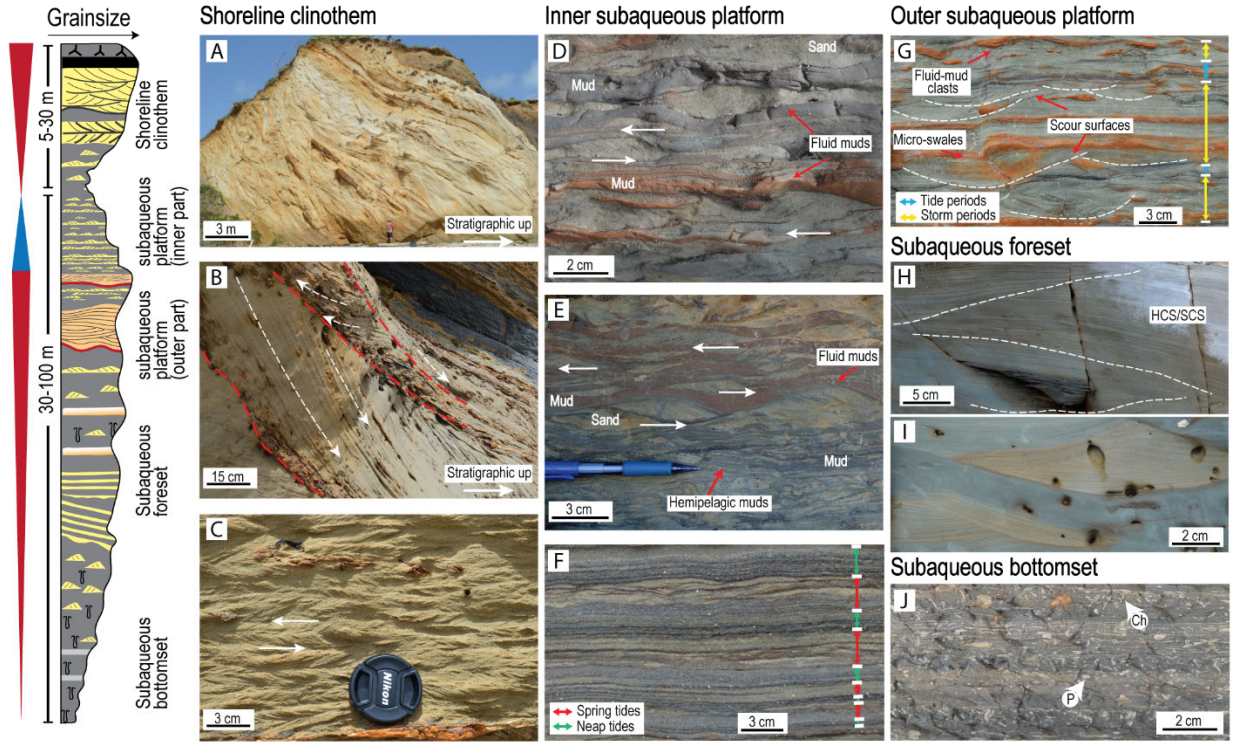

Figure S3. Recognition diagram for tide-dominated compound-clinoform deltas with facies association examples (the paleo-Orinoco delta) showing shoreline clinothem (A-C), inner subaqueous platform (D-F), outer subaqueous platform (G), muddy subaqueous foreset with occasional wave-generated sandstones (H-I), and subaqueous bottomset (J). (A) A tidal distributary channel containing multiple dunes. (B) Bidirectional cross-bedded sandstones with mud clasts. (C) Bidirectional current-rippled sandstones. (D) Thick fluid-mud layers interbedded with bidirectional current-rippled sandstones. (E) Thick, unbioturbated fluid-mud layers interbedded with bi-directional current-rippled sandstones in the upper part, and thin hemipelagic-mud layers with bioturbation in the lower part. (F) Alternating thicker-bedded and thinner-bedded intervals forming spring and neap tidal bundles with abundant organic matter. (G) Micro-swaley storm-wave strata intercalated with tidal deposits of parallel-laminated sandstones with organic-matter drapes. Note the abundance of scour surfaces and fluid-mud clasts/flasers. (H) Hummocky and swaley cross-bedded (HCS/SCS) sandstones. (I) Wave-rippled sandstones. (J) Thin hemipelagic-mud deposits with occurrence of *Chondrites* (Ch) and *Planolites* (P). See details in Peng et al. (2018a, b).

RECOGNIZING WAVE-DOMINATED COMPOUND-CLINOFORM DELTAS IN ROCK RECORD

1. Mophologically it has low number of distributaries with shore-parallel sand ridges in the shoreline clinoform; narrow subaqueous platform (< 30 km); subaqueous rollovers are commonly located downstream of the river mouth.
2. Two stacked coarsening-upward packages representing the shoreline clinothem (5-30 m thick) and the subaqueous clinothem (30-100 m thick); the subaqueous platform can be clean and sand-prone compared with the linked two clinothems due to storm wave-reworking.
3. The shoreline clinothem consists of coarser grained, upward-coarsening HCS/SCS and cross-bedded sandstones interbedded with siltstones.
4. The subaqueous platform is characterized by thin SCS/HCS and wave-rippled sandstones with frequent scour bases and sometimes with winnowed lag deposits (mud clasts, shell fragments).
5. The subaqueous foreset is dominated by wave-enhanced sediment-gravity-flow deposits, wave-rippled sandstones, and fluid-mud deposits.

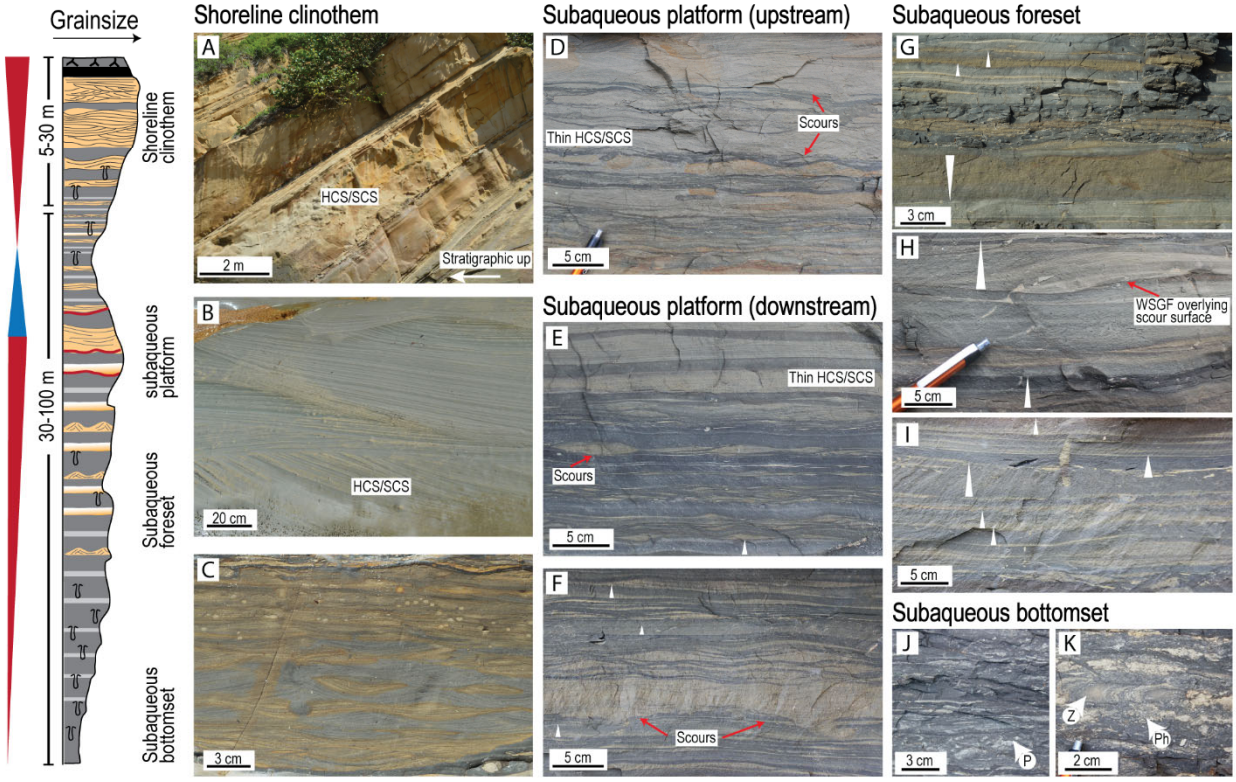

Figure S4. Recognition diagram for wave-dominated compound-clinoform deltas with facies association examples (the paleo-Orinoco Delta) showing shoreline clinothem (A-C), upstream subaqueous platform (D), downstream subaqueous platform (E-F), subaqueous foreset (G-I), and subaqueous bottomset (J-K). (A) Stacked units of thick, amalgamated hummocky/swaley cross-stratified (HCS/SCS) sandstones (2-3 m) separated by thin muddy beds. (B) Detailed view of HCS/SCS. (C) Wave-rippled sandstones. (D) A sandy succession consisting of interbedded thin HCS/SCS sandstones and mudstones with multiple scour bases. (E-F) A muddy succession comprising thin HCS/SCS sandstones, thick fluid-mud layers, and wave-enhanced sediment gravity flow (WSGF) deposits overlying scour surfaces. (G-I) WSGF deposits characterized by muddy normal graded beds changing from lower very fine-grained sandstones gradually or sharply overlain by relatively thick siltstones and mudstones. (J-K) Bioturbated mudstones and siltstones with *Planolites* (P), *Phycosiphon* (Ph), and *Zoophycos* (Z).

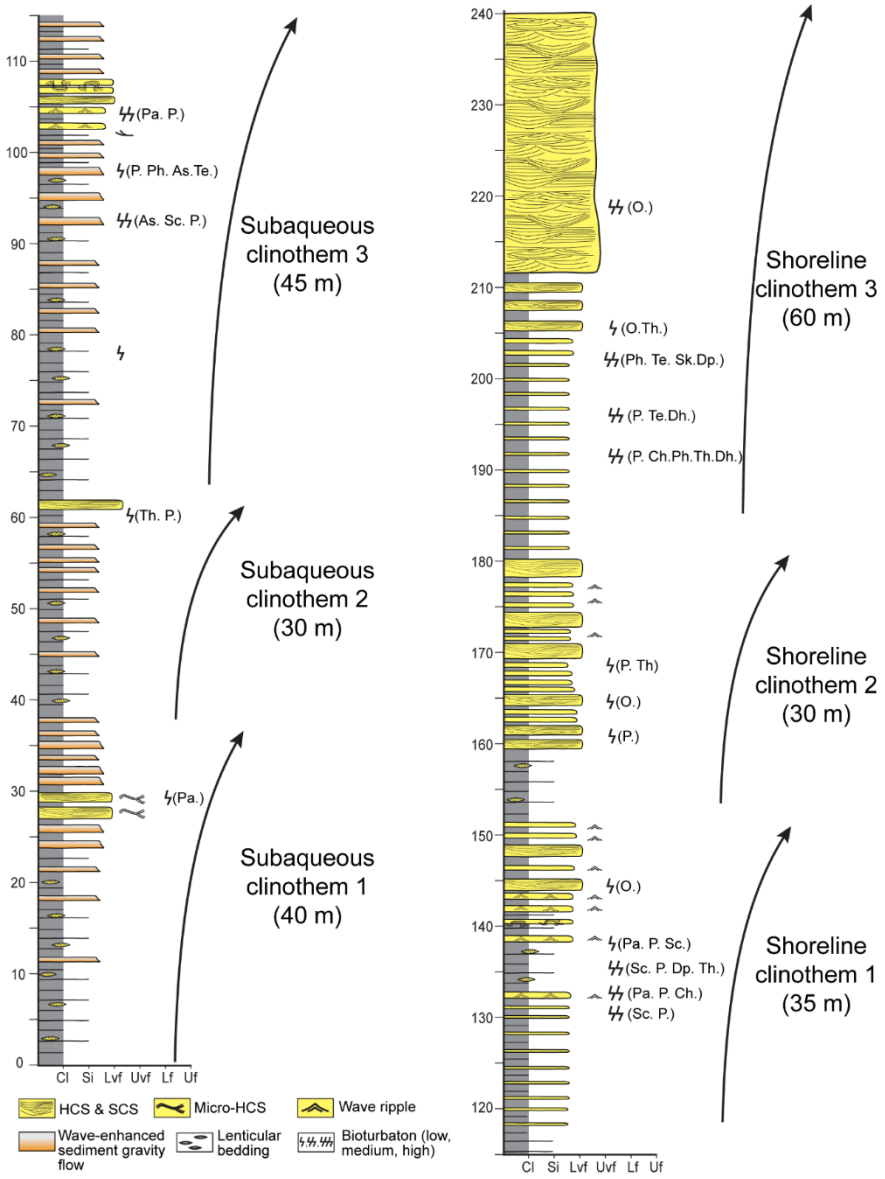

Figure S5. A measured section of a wave-dominated compound-clinoform delta (Moruga Fm, the paleo-Orinoco delta) at Radix Point, Trinidad. The succession is relatively thick due to rapid subsidence of the Pliocene Orinoco margin on the outer shelf.

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Peng, Y., Steel, R. J., Rossi, V. M., and Olariu, C., 2018a, Mixed-energy Process Interactions Read from a Compound-clinoform Delta (paleo–orinoco Delta, Trinidad): Preservation of River and Tide Signals By Mud-induced Wave Damping: Journal of Sedimentary Research, v. 88, p. 75-90.

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