[PS]Early Tortonian Shallow Shelf Calcarenitic Deposits under Tidal Influence: Facies, Architecture and Quantification, Agua Amarga Basin, Almería, SE Spain*

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Abstract

The study area is located in Agua Amarga Basin in the southeastern part of the Iberian Peninsula in the postorogenic Neogene basins superimposed on the reliefs of the Betic Range intensely affected by Neogene Volcanism even during the time of deposition.

A sedimentology, sequence stratigraphy and paleogeography study, was made for the preparation of an integrated conceptual model of the lowermost section filling of the Agua Amarga Basin (early Tortonian, Late Miocene). There are two major facies associations, the carbonate-dominated facies (coarse-medium-grained, bryozoans, molluscs, foraminifera, echinoids and red algae calcarenites-calcirudites, with muddy lamination) on the one hand and, mixed facies consisting of volcanic and volcano-sedimentary facies (sandstones and conglomerates of composition volcanic or volcanic-carbonate) on the other hand. Interpreted depositional environments includes aeolian; fluvial floodplain; fan deltas or alluvial fan volcano-sedimentary deposits; delta; estuarine-protected level, supratidal; shoals/barrier islands; channels/tidal channels; washover-fan; muddy intertidal; calcarenites from intertidal-subtidal bars. Marginal marine to shallow marine are predominant. Taking into the results from earlier field research, facies associations, correlation between log sections and the architecture can be interpreted as the infill of a small gulf or estuary where sedimentation is not even associated with the natural or tectonic irregularities of the basement. The embayment morphology amplifies the tidal action and control on sedimentation. The area was protected, confined and restricted and for this reason, the tidal calcarenite deposits are well preserved.

Analysis of stacking pattern (facies succession) and lateral variation supports sequence analysis and the interpretation of systems tracts. The filling of the basin over the volcanic basement consists of: (1) fluvial facies refilling preexistent valleys (LST); (2) intertidal facies, washover-fan or ebb-deltas towards the west, filling the spaces exceeding the volcanic paleohigh thresholds (TST); (3) more open and no confined environments with subtidal facies progradation (HST+FSST); (4) barrier island and estuary fill (toward west paleocurrents, associated with closed environments) (LST+TST); (5) paleokarsts and paleosols (FSST+SB); and (6) transgressive facies (TST).

Early Tortonian shallow shelf calcarenitic deposits under tidal influence. Facies, architecture and quantification. *Agua Amarga Basin, Almería. (SE Spain)*

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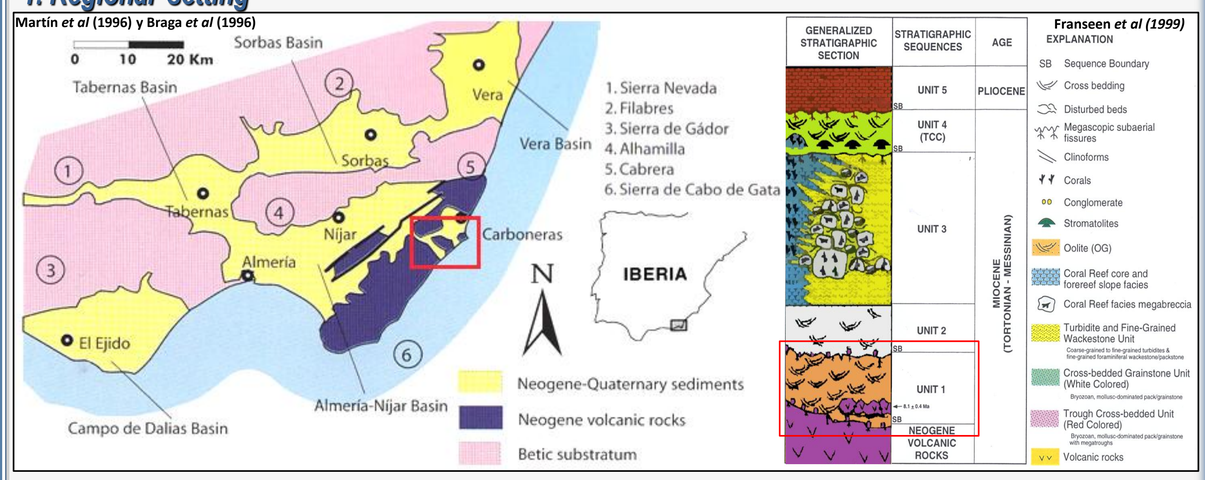
1. Regional setting

Martín *et al* (1996) y Braga *et al* (1996)



- ***Agua Amarga Basin*** (Postorogenic Neogene basins superimposed on the reliefs of the Betic Range)
- Intensely affected by Neogene Volcanism even during the time of deposition.

2. Objective

A sedimentology, sequence stratigraphy and paleogeography study, was made for the preparation of an integrated conceptual model of the lowermost section filling of the Agua Amarga Basin (early Tortonian, Late Miocene).

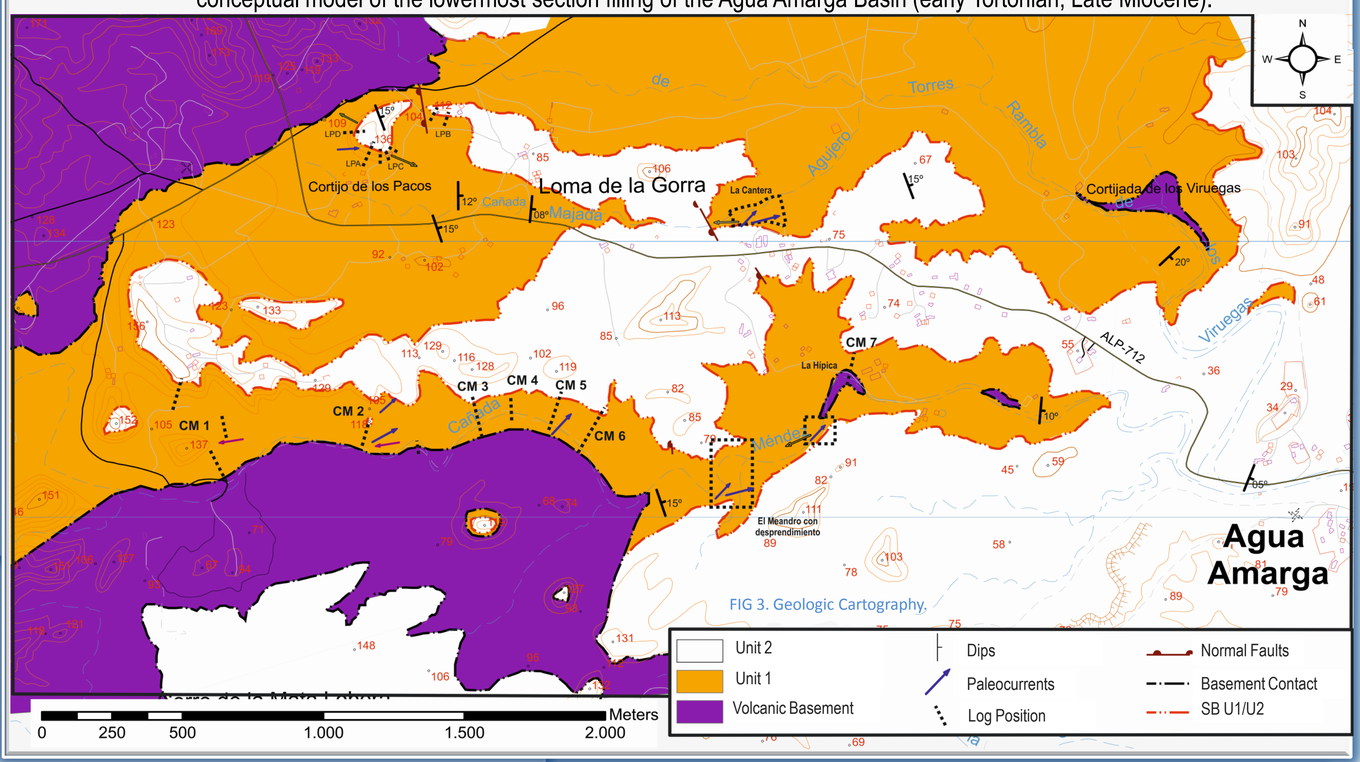
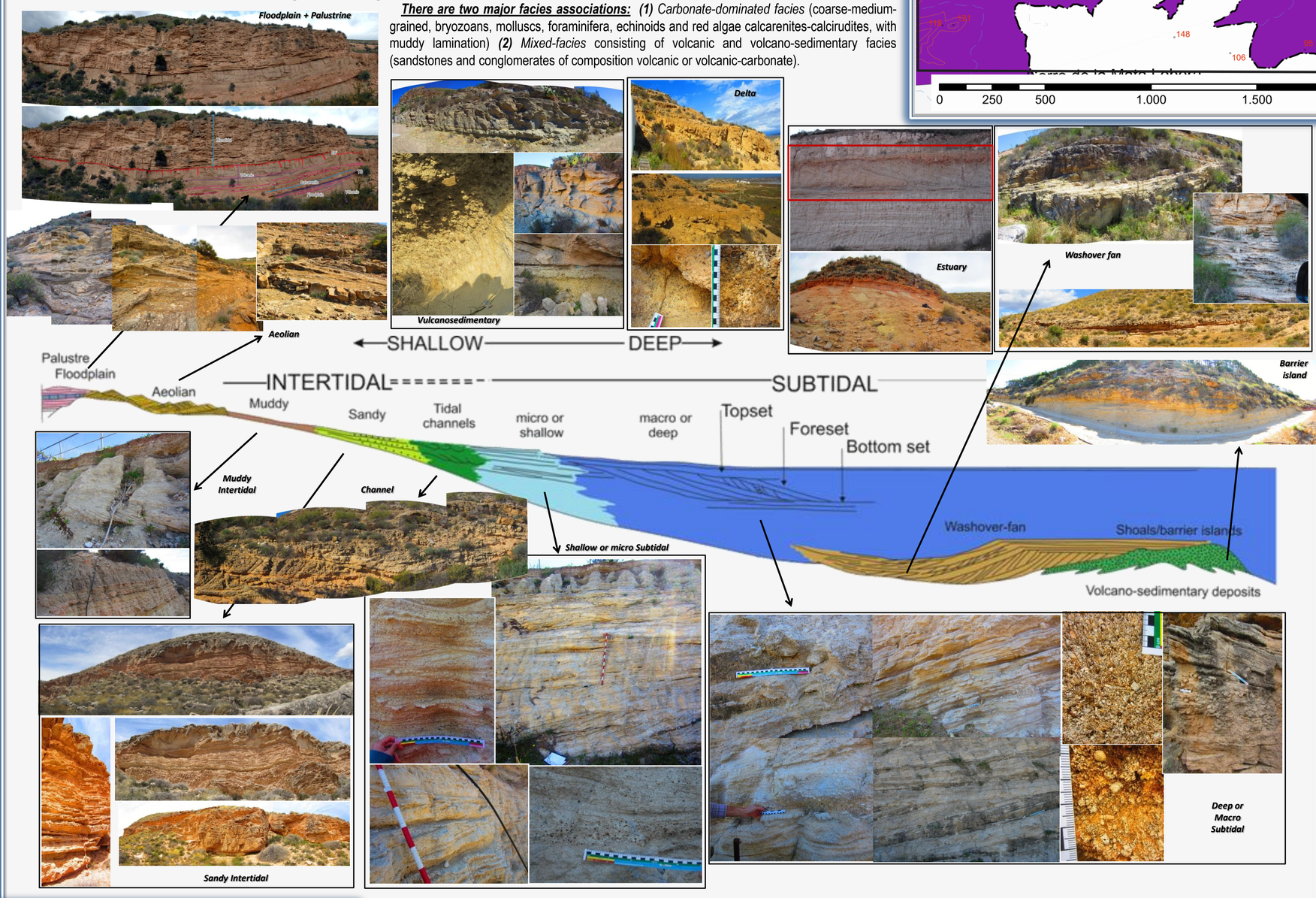
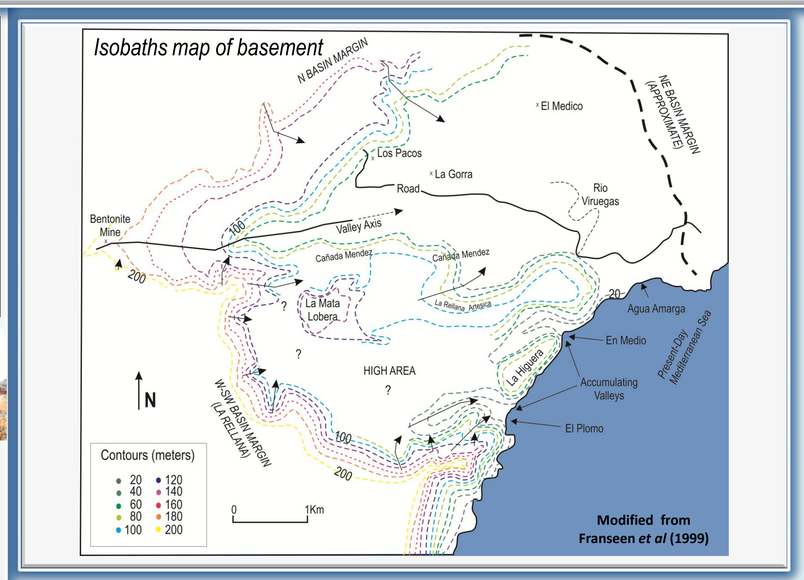


FIG 3. Geologic Cartography.

3. Facies associations and Interpreted depositional environments

There are two major facies associations: ***(1)*** *Carbonate-dominated facies* (coarse-medium-grained, bryozoans, molluscs, foraminifera, echinoids and red algae calcarenites-calcirudites, with muddy lamination) ***(2)*** *Mixed-facies* consisting of volcanic and volcano-sedimentary facies (sandstones and conglomerates of composition volcanic or volcanic-carbonate).



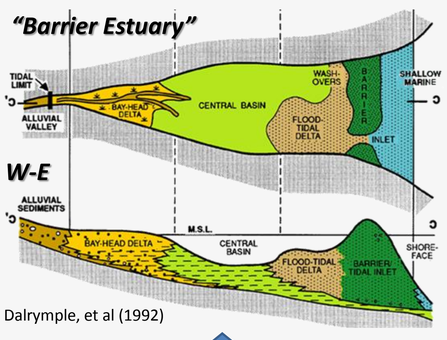


4. Sequence stratigraphy and Depositional model

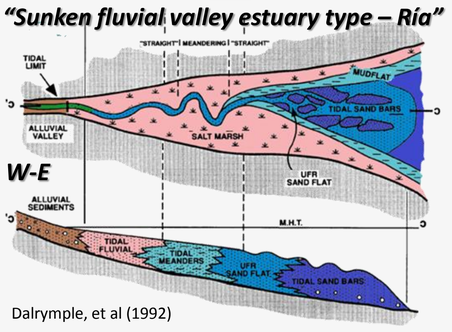
Schematically, sequence stratigraphy and history of the study area can be summarized in the following points:

1) **Fluvial valleys** instalation **over volcanic basement** and **vulcanoclastics deposit** formation (low sea level)
2) **Washover fan** and **sandy intertidal platforms** towards the west, filling the spaces exceeding the volcanic paleohigh thresholds (rising - high sea level)
3) More open and no confined environments with **subtidal facies progradation** (high - lowering sea level)
4) In some marginal areas, **aeolian** and **progradational deltaic facies** are observed.
5) **Barrier island** and **estuary fill** (toward west paleocurrents, associated with closed environments) (low - rising sea level)
6) **Channel** and **beaches facies** deposition (high-lowering sea level)
7) Paleokarsts and paleosols - SB (low sea level).
8) **Transgression of U2 on U1** (rising-high sea level).

5. Discussion and Conclusions



Dalrymple, et al (1992)



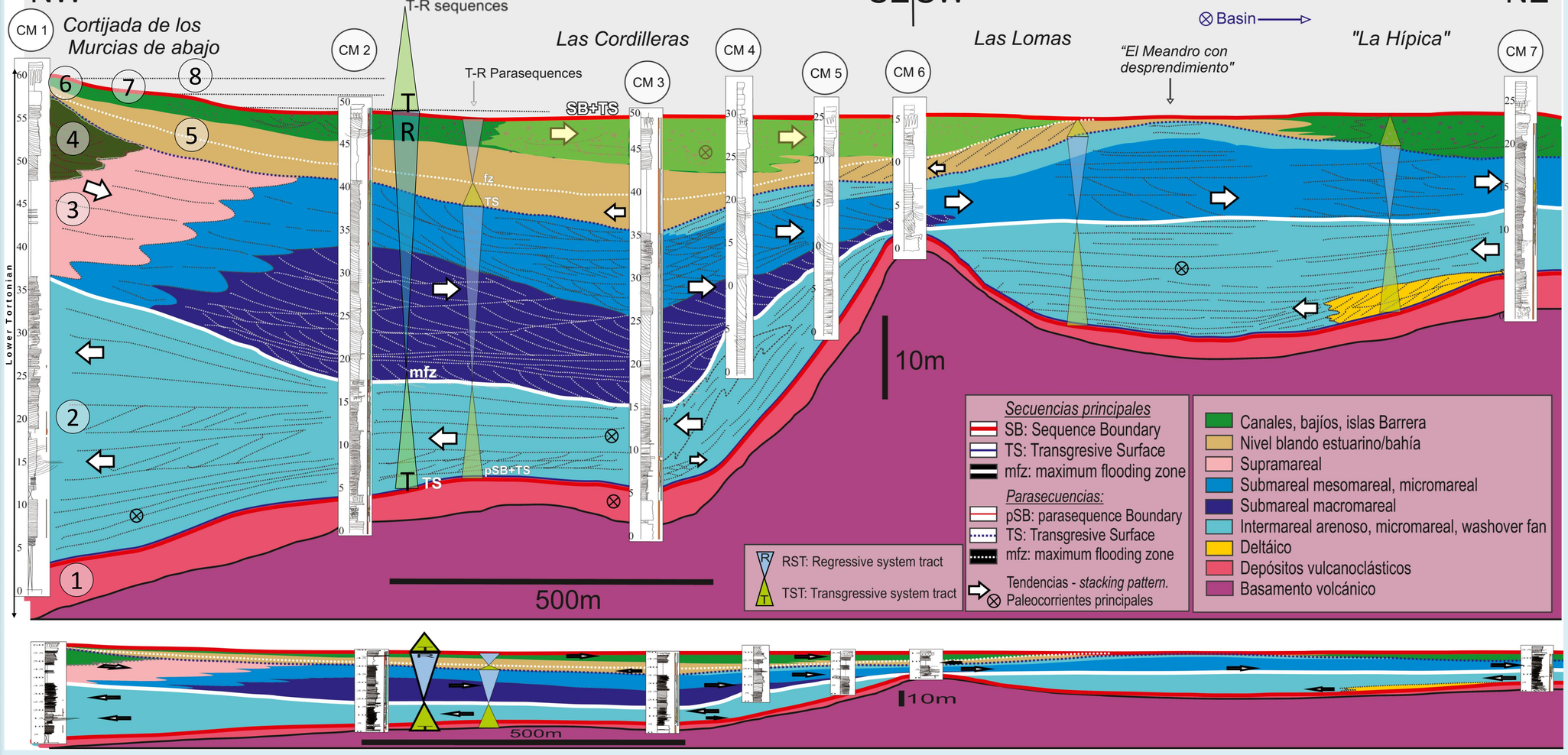
Dalrymple, et al (1992)

Marginal marine to **shallow marine** are predominant.

Taking into the results from earlier field research, facies associations, correlation between log sections and the architecture can be interpreted as the **infill** of **a small gulf** or **estuary** where **sedimentation** is not even associated with the **natural** or **tectonic irregularities** of the **basement**.

The **embayment morphology amplifies the tidal action** and control on sedimentation.

The area was **protected**, **confined** and **restricted** and for this reason the **tidal calcarenite** deposits are **well preserved**.



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