

# Is the Simultaneous Onset of the Florida, East Australia, and Indian Ocean Currents Related to Himalayan tectonics?

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## Abstract

Carbonate drift deposits in the Santaren Channel, on the Marion Plateau and in the Inner Sea of the Maldives were cored and dated by ODP and IODP expeditions. The ages based on biostratigraphy of these drifts are 11.4 Ma (Marion Drift), 12.3 Ma (Santaren Drift) and 12.9 Ma (Maldives Inner Sea), indicating a near simultaneous onset of the Florida, East Australia and Indian Ocean Currents that are all part of the global ocean current system. The Himalayan tectonics started with the collision of the Indian continent with Asia about ~50 Ma ago and continues today. The uplift of the Himalaya and Tibetan Plateau was not steady and not consistent across the mountain belt. The uplift of the southern and central Tibetan Plateau occurred from 40–35 Ma, at the northern Tibetan plateau at approximately 25–20 Ma, and at the northeastern to eastern Tibetan plateau at ~15 Ma. Significant increases in altitude of the entire Tibetan plateau are thought to have occurred about 10–8 Ma ago or more recently, some 3 myrs after the onset of the modern Indian Ocean monsoon-driven circulation system that is dated at 12.9 Ma. This sudden onset or intensification is puzzling in light of the continuous uplift of the Himalaya and Tibetan Plateau. If a linkage between tectonics and climate exists, the uplift must have stepped over a threshold that caused the climate to change dramatically. The near simultaneous onset of the global ocean circulation and the intensification of the monsoon is strong evidence that a combination of factors caused the sudden climate change. It is likely that onset of the intense monsoon is the combined result of the tectonic configuration, consisting of the Himalayan uplift but also the closing of the Tethyan seaway, and progressive glaciation on Antarctica.



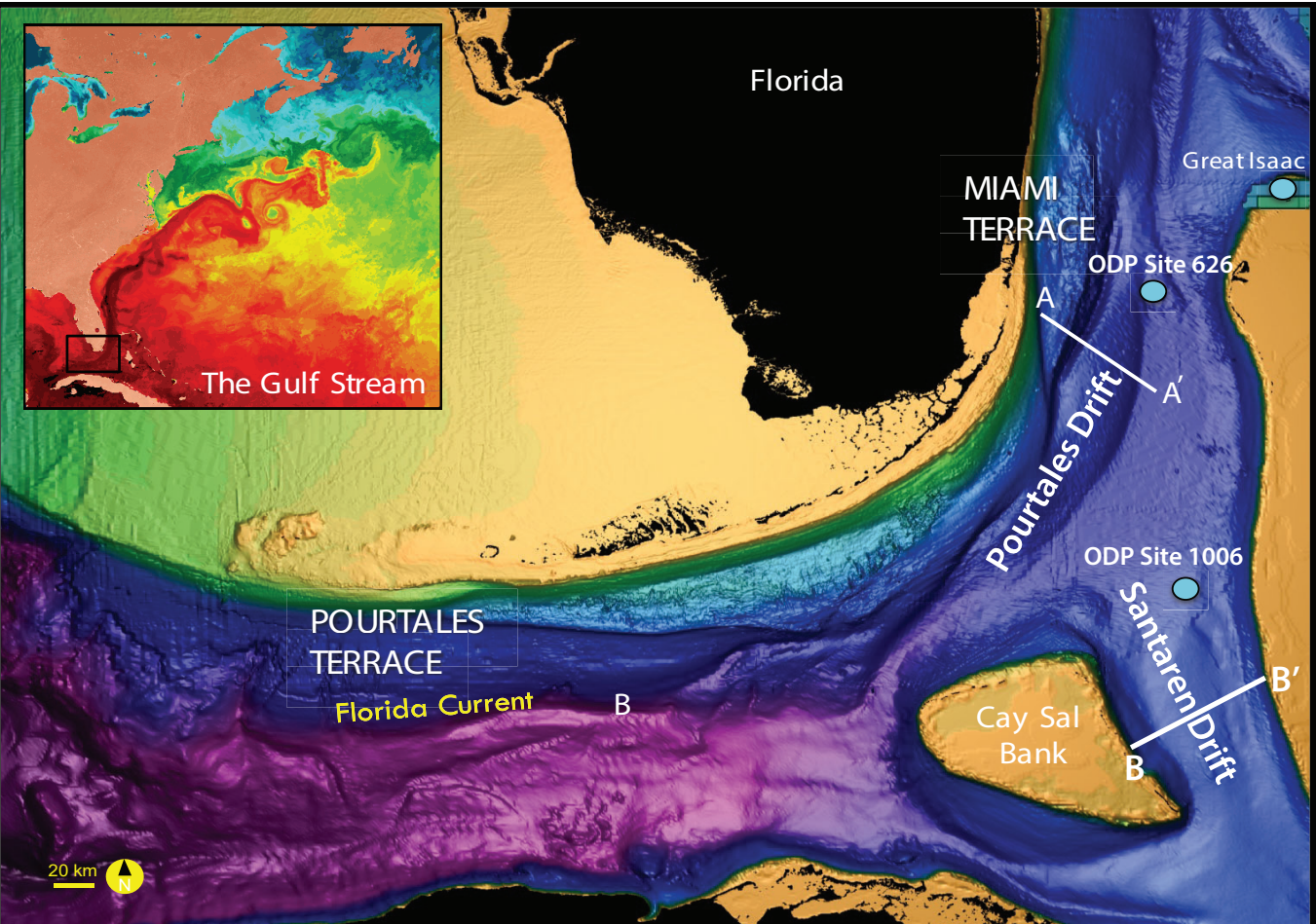
# Is the Simultaneous Onset of the Florida, East Australia, and Indian Ocean Currents Related to Himalayan tectonics?

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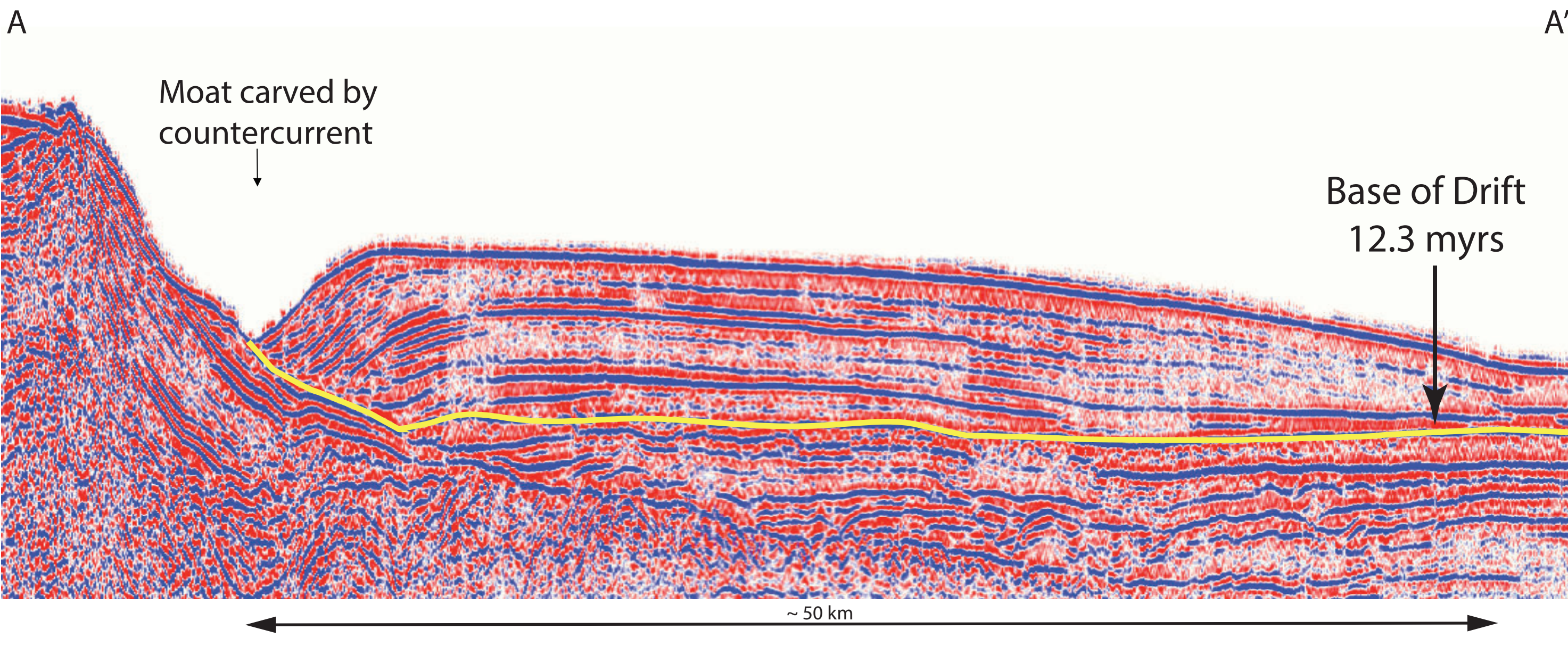
## Straits of Florida and Santaren Channel

### Location

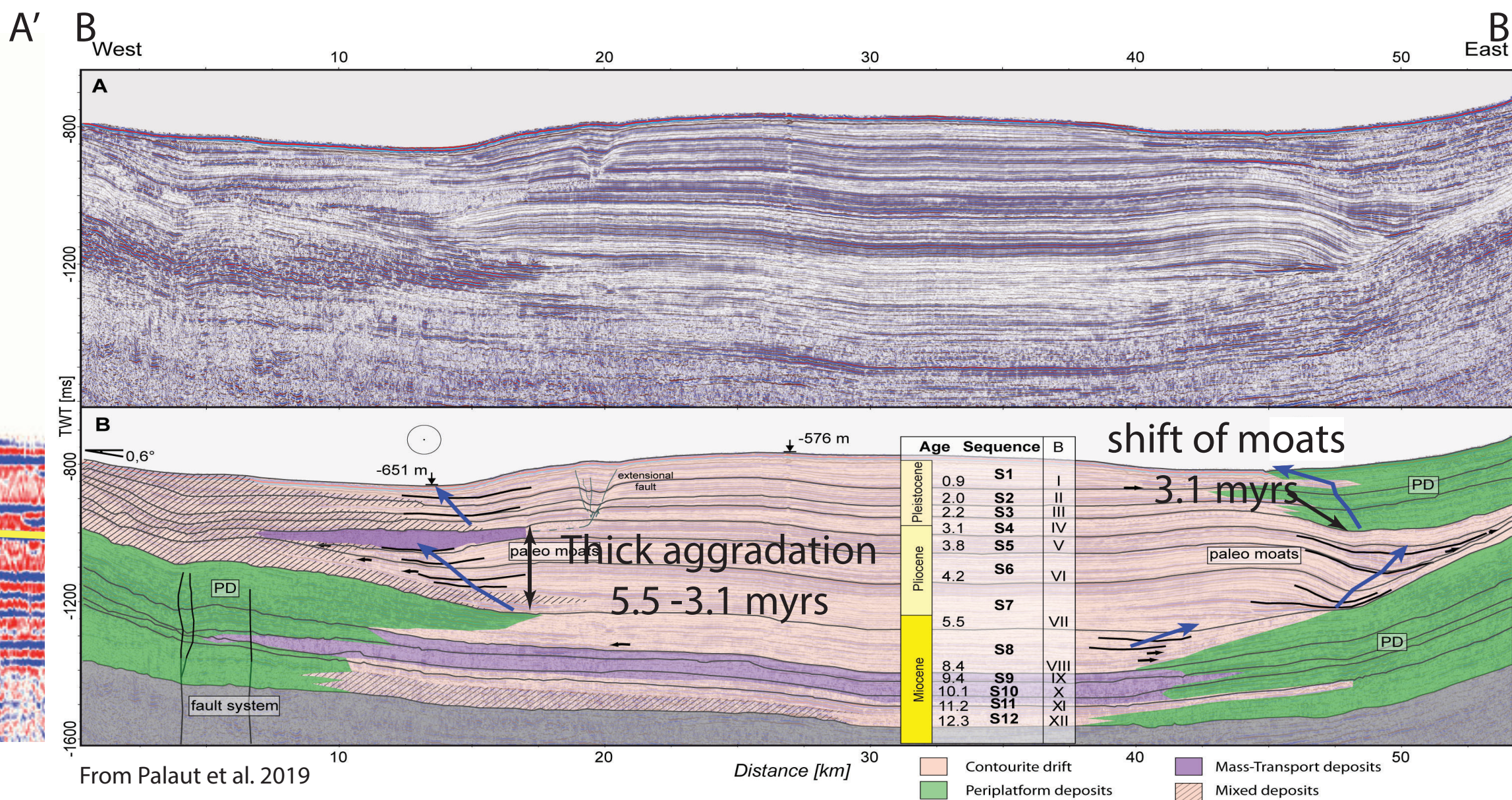


Bathymetric map of the Straits of Florida showing the contourite drifts deposited by the Florida Current and its tributaries. A-A' seismic line across Pourtales Drift. B-B' seismic line across Santaren Drift.

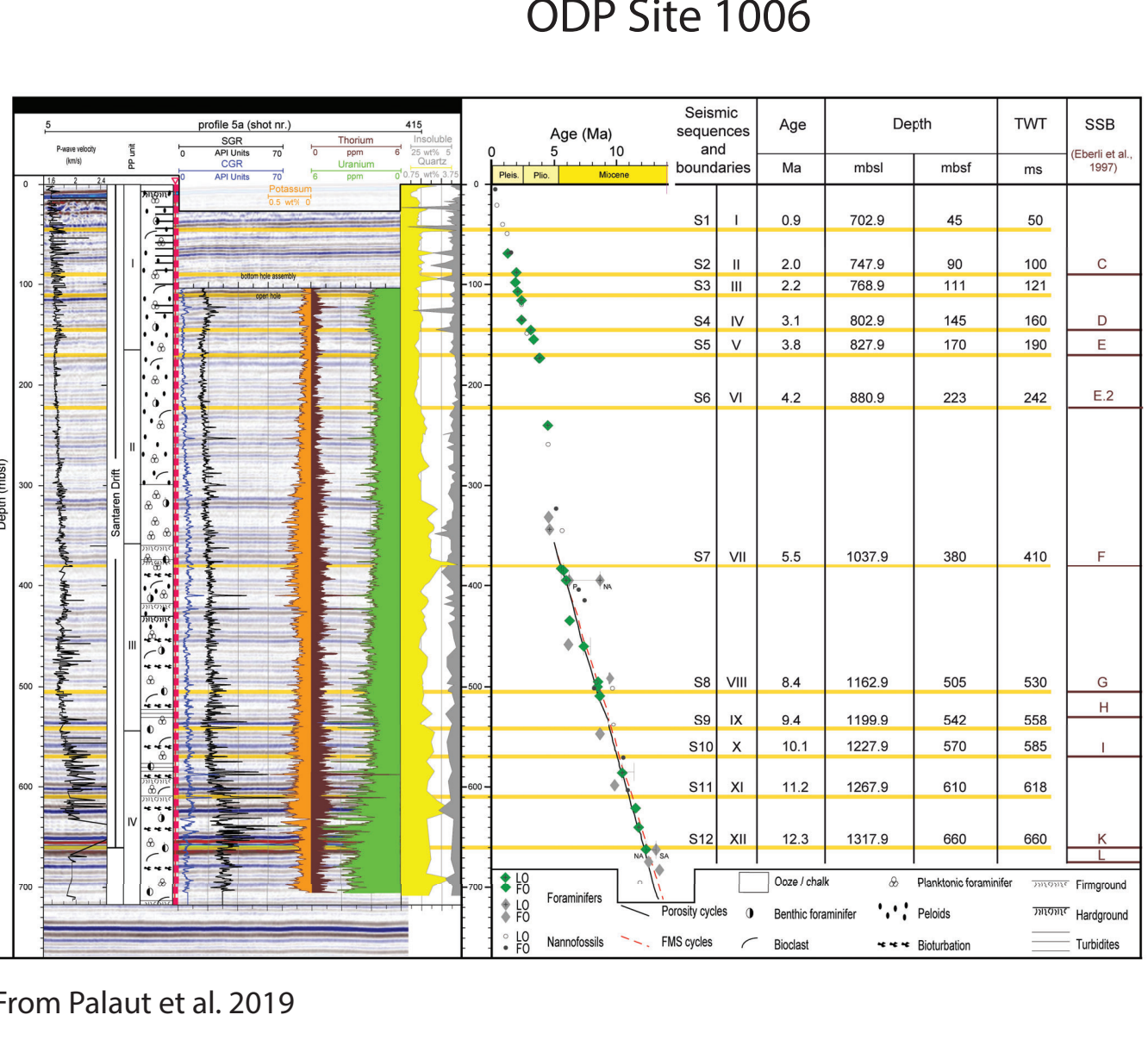
### Pourtales Drift



### Santaren Drift

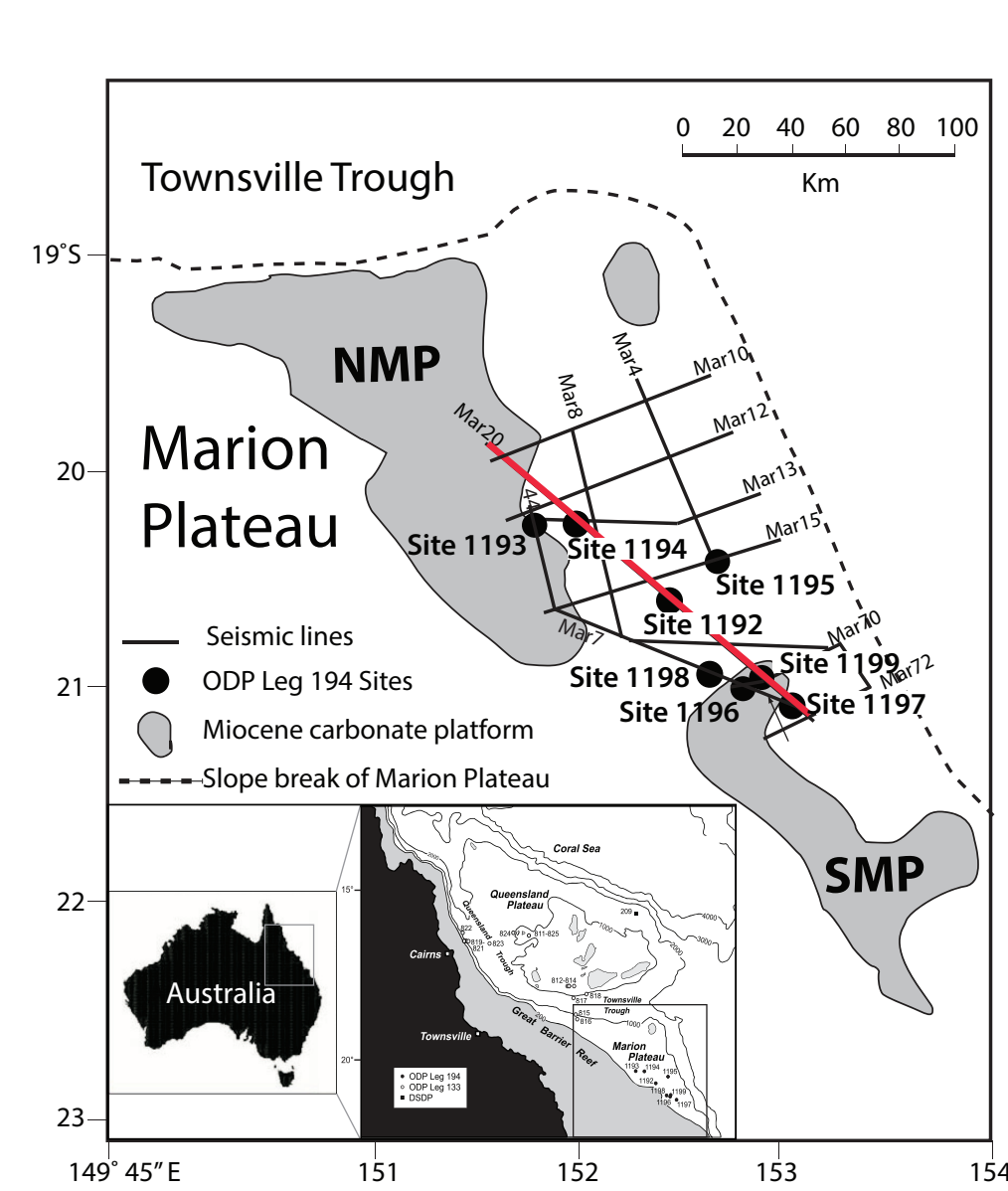


### Age Model

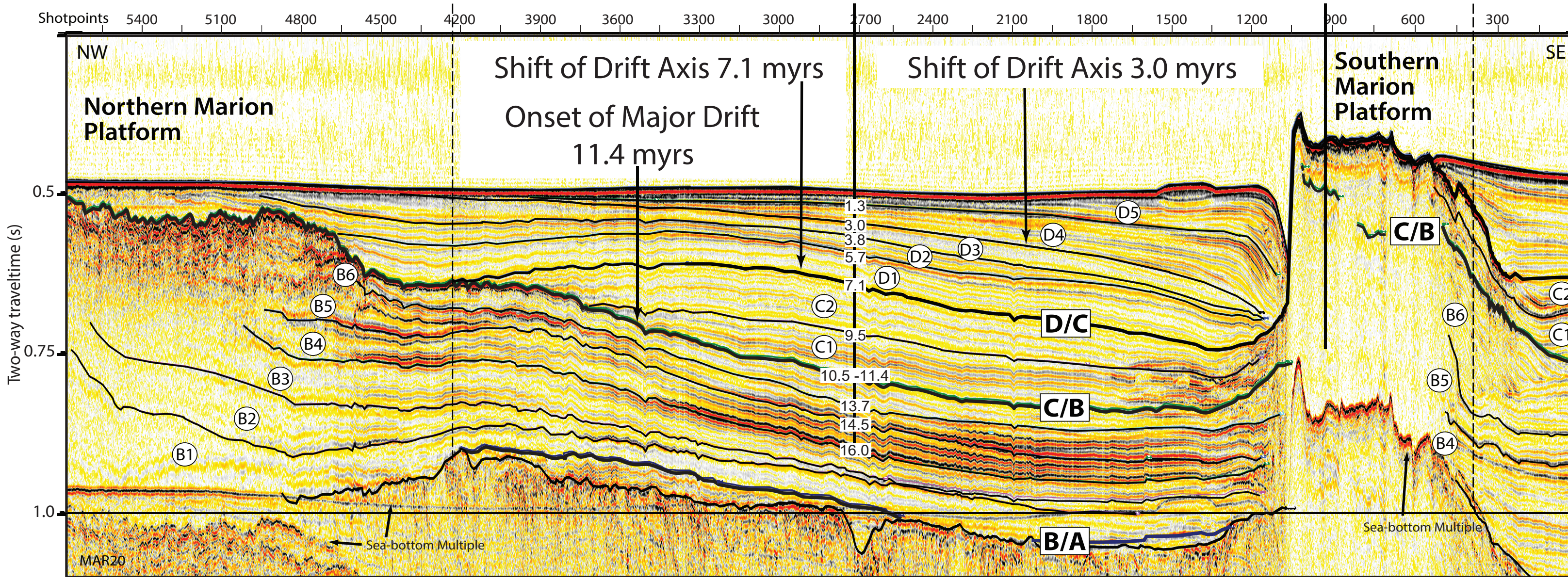


## Marion Plateau - East Australian Margin

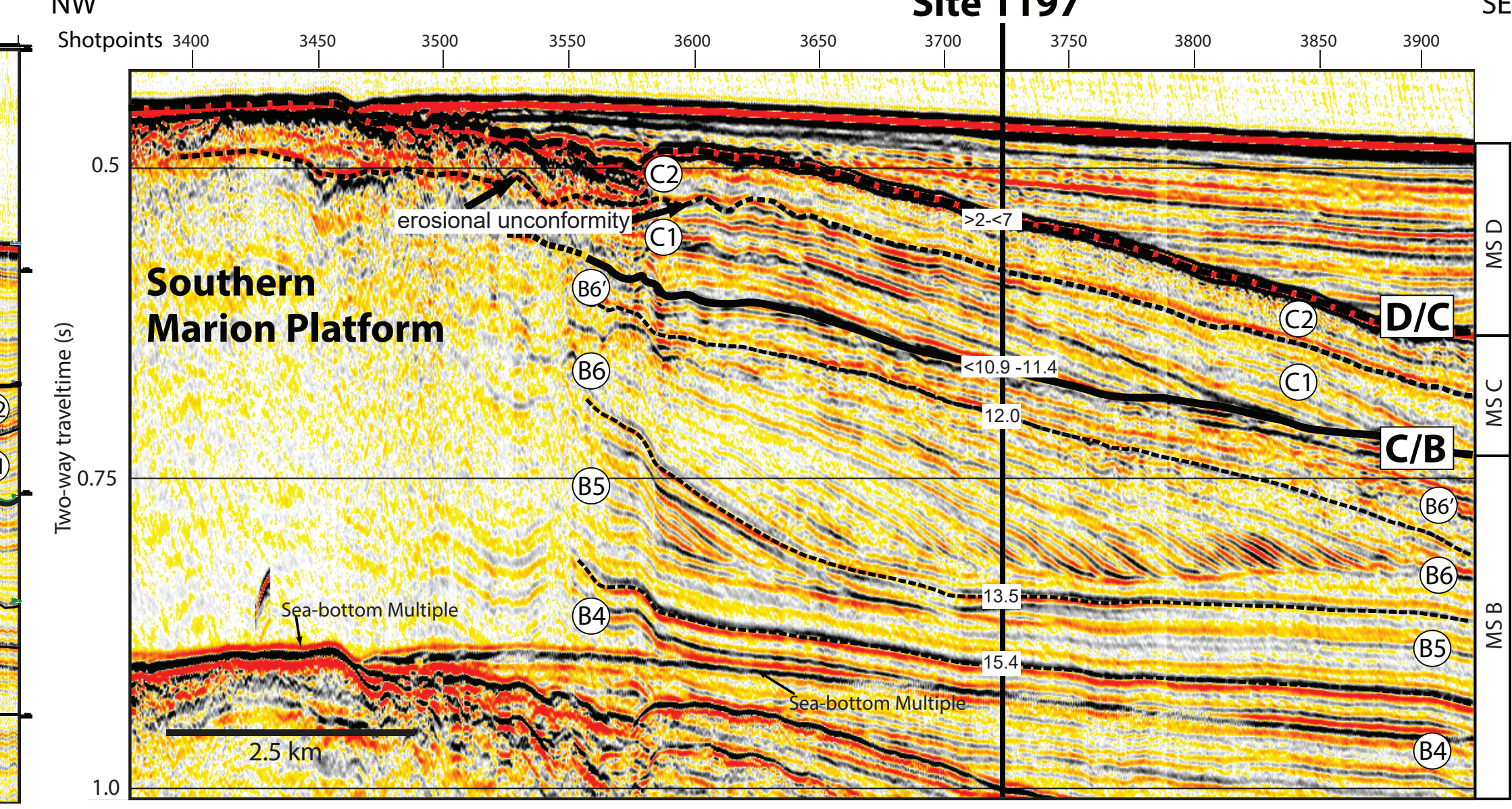
### Location



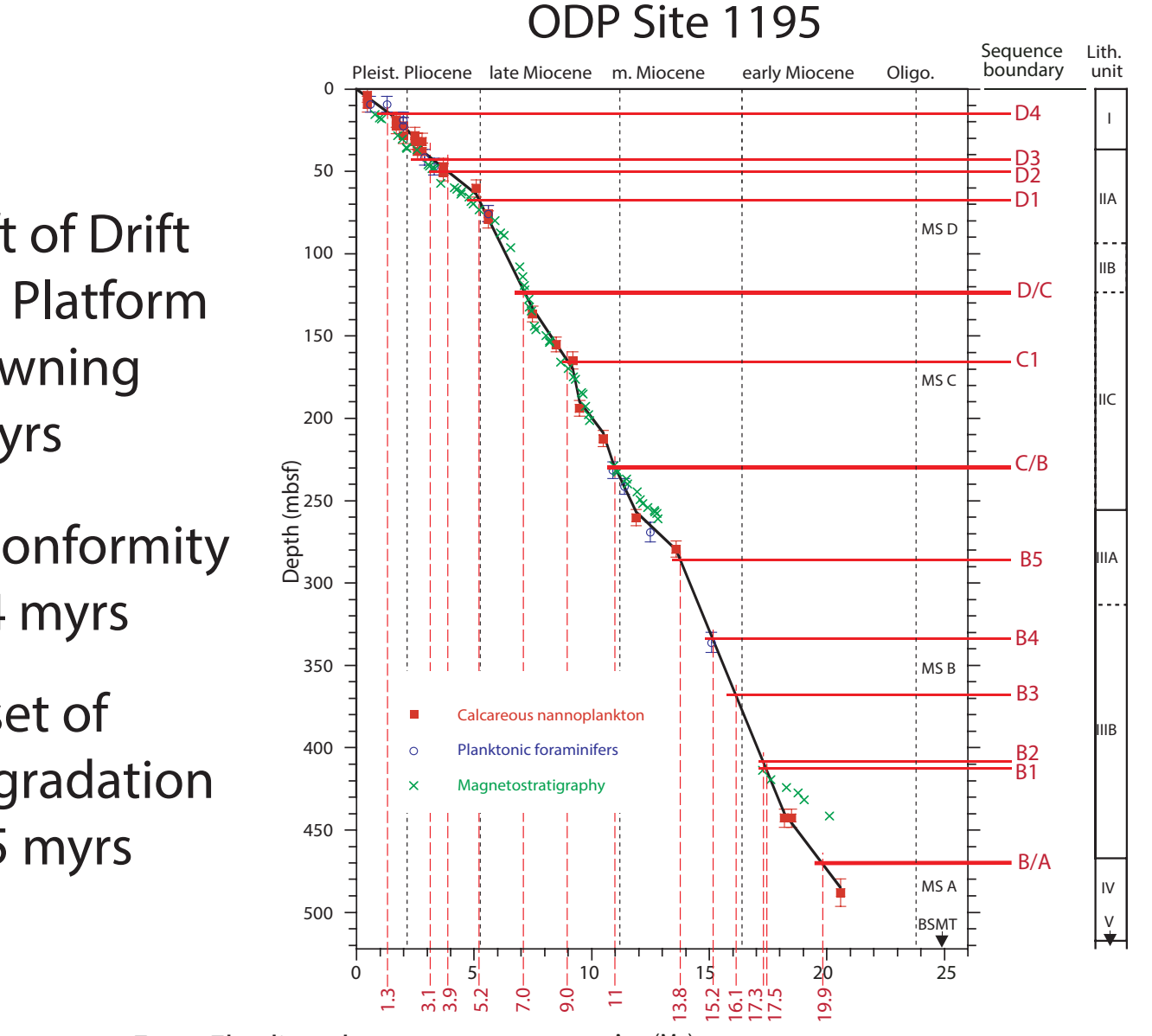
### Marion Drift



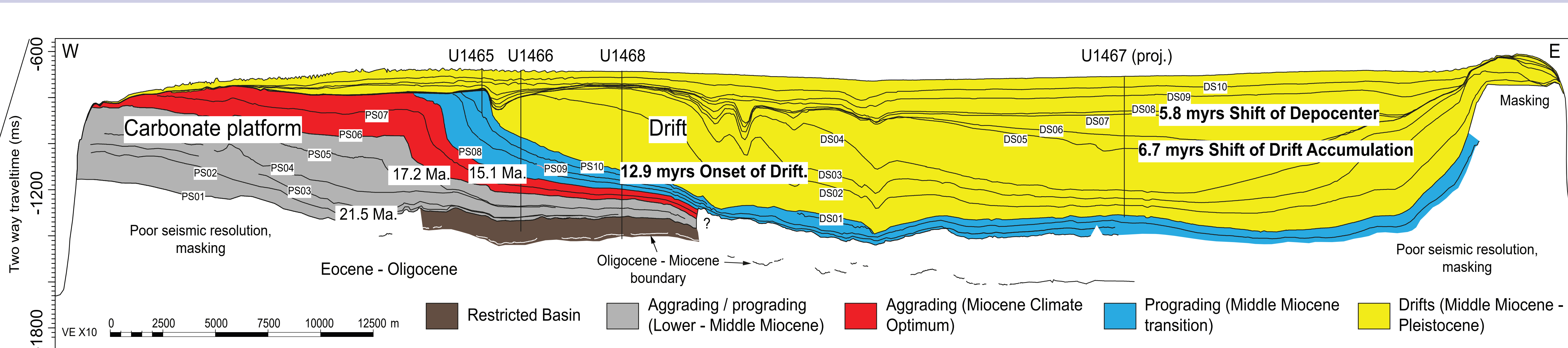
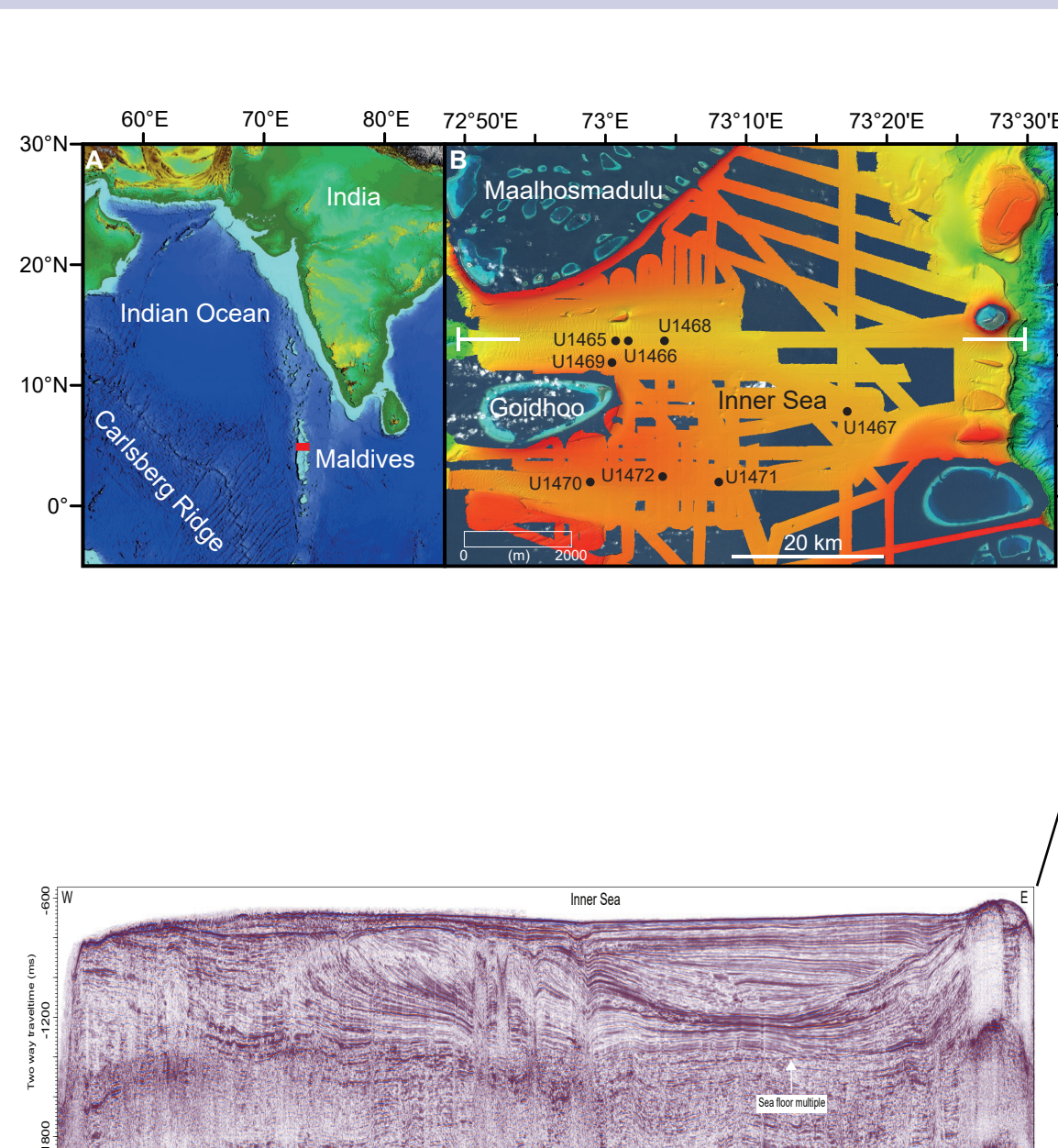
### Current-Controlled Progradation



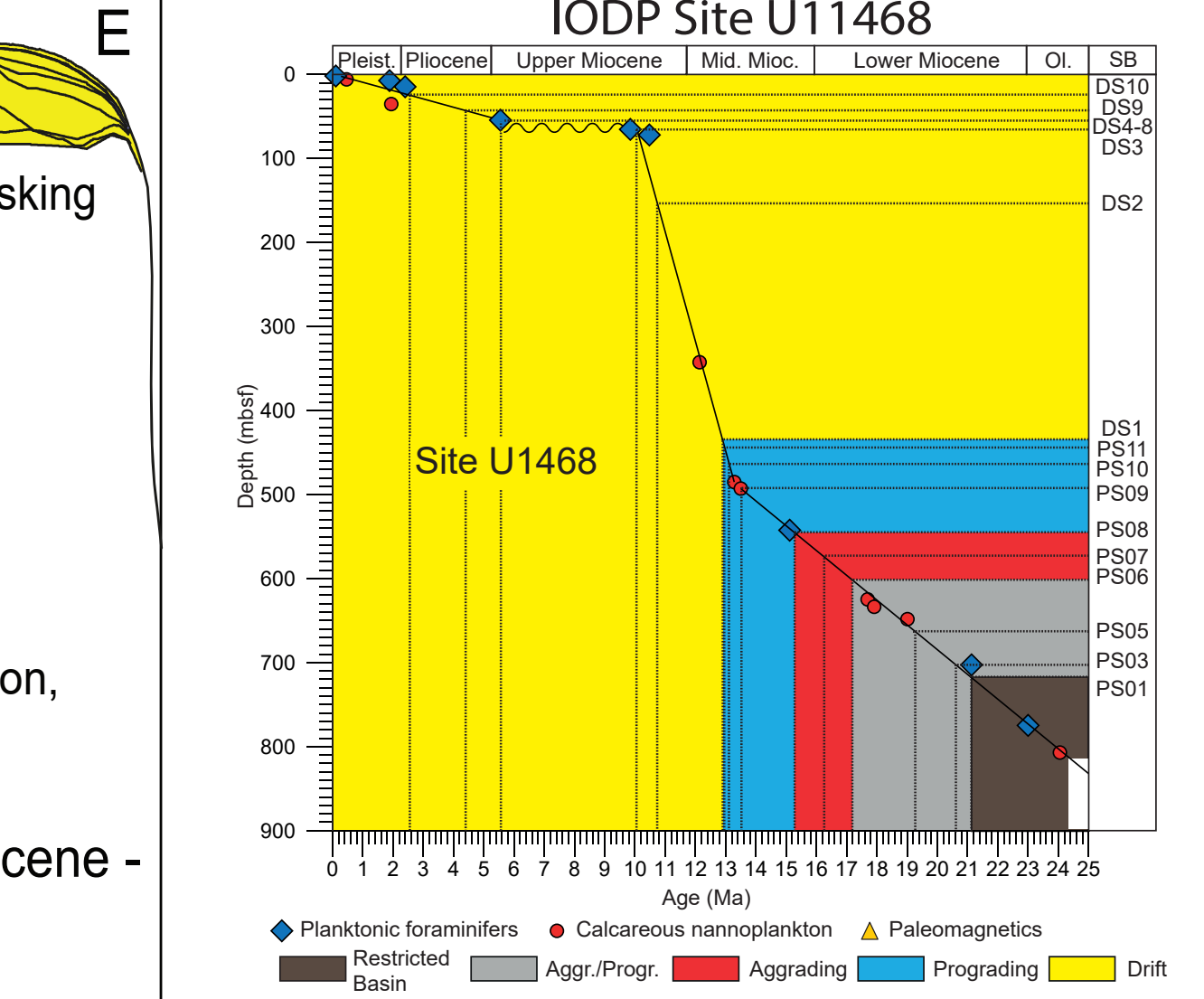
### Age Model



## Maldives Inner Sea



### Age Model



Forida Current events	Regional Tectonic events	E Australian Current events	Regional Tectonic events	Monsoon Current events	Regional Tectonic events	Himalaya Tibet	Abstract
Based on Palaut et al. 2019	Based mostly on Poore et al. 2006	Based on Eberli et al. 2010	Based on Holm et al. 2015	Based on Betzler et al. 2016 and Ludmann et al. 2018	Based on Reuter et al. 2009	Based on Molna et al. 2010; Trambly et al., 2015; Yin, 2006)	Carbonate drift deposits in the Santaren Channel, on the Marion Plateau and in the Inner Sea of the Maldives were cored and dated by ODP and IODP expeditions. The ages based on biostratigraphy of these drifts are 11.4 Ma (Marion Drift), 12.3 Ma (Santaren Drift) and 12.9 Ma (Maldives Inner Sea), indicating a near simultaneous onset of the Florida, East Australia and Indian Ocean Currents that are all part of the global ocean current system.
3.1 myrs Shift of moats and increase of flow	3.5 - 2.8 myrs final closure of Central America Seaway (CAS)	3.1 myrs Shift of drift axis	3.0 myrs Closure of Solomon Sea	5.8 myrs Shift of depocenter eastward	7 - 4 myrs Development of Lesser Himalayan duplex system	The Himalayan tectonics started with the collision of the Indian continent with Asia about ~50 Ma ago and continues today. The uplift of the Himalaya and Tibetan Plateau was not steady and not consistent across the mountain belt. The uplift of the southern and central Tibetan Plateau occurred from 40–35 Ma, at the northern Tibetan plateau at approximately 25–20 Ma, and at the northeastern to eastern Tibetan plateau at ~15 Ma. Significant increases in altitude of the entire Tibetan plateau are thought to have occurred about 10–8 Ma ago or more recently, some 3 myrs after the onset of the modern Indian Ocean monsoon-driven circulation that is dated at 12.9 Ma.	
5.5-3.1 myrs Highest accumulation rates within the drift in a mounded elongated drift	4.6 myrs CAS shallower than 100 m	7.1 myrs Shift of drift axis	7.0 myrs slab break-off and lithospheric delamination and a second phase of orogenesis in New Guinea	6.7 myrs Top of delta drift deposition	12 -11 myrs Rapid exhumation of Himalaya -Tibet	This sudden onset or intensification is puzzling in light of the continuous uplift of the Himalaya and Tibetan Plateau. If a linkage between tectonics and climate exists, the uplift must have stepped over a threshold that caused the climate to change dramatically. The near simultaneous onset of the global ocean circulation and the intensification of the monsoon is strong evidence that a combination of factors caused the sudden climate change. It is likely that onset of the intense monsoon is the combined result of the tectonic configuration, consisting of the Himalayan uplift but also the closing of the Tethyan seaway, and progressive glaciation on Antarctica.	
12.3 myrs Onset drift deposition	13.1 -12.2 myrs Separation of benthic fauna between Caribbean/Pacific begin of closure of CAS	(13.5) - 11.4 myrs Onset current-controlled progradation and drift deposition	12 myrs Continent collision Australia - New Guinea and start of orogenesis	12.9 myrs	~ 20 myrs Closure of Tethyan Seaway		