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Online Event

UFSC

projeto BAY SQUEEZE
Baía da Babitonga

# Seismic investigation of the mouth of Babitonga Bay, SC, and its adjacent Internal Platform


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projeto BAY SQUEEZE

Baía da Babitonga

https://baysqueeze.ufsc.br/

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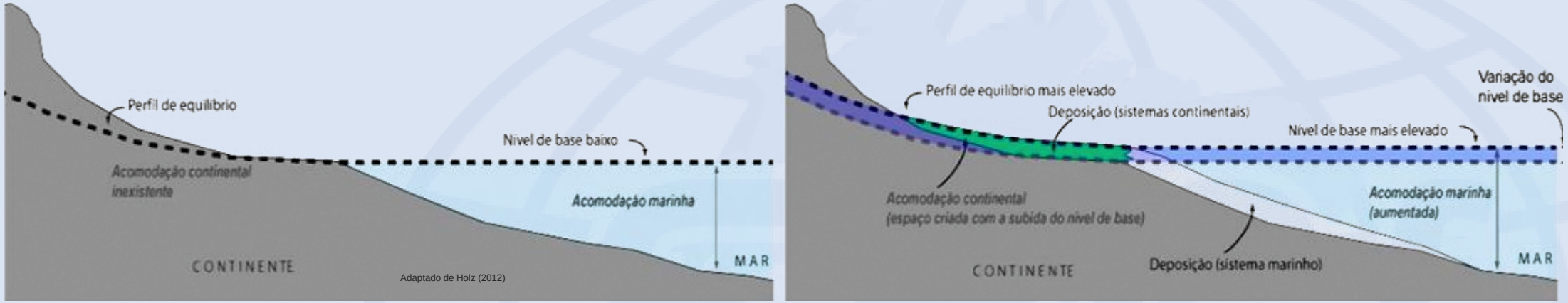
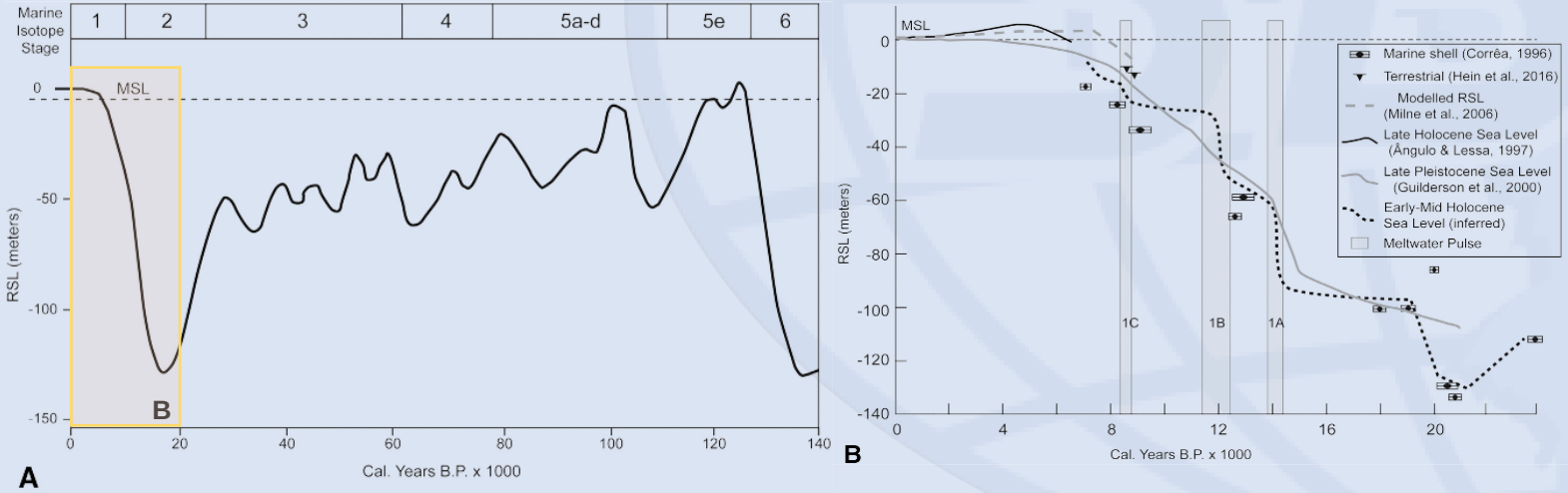
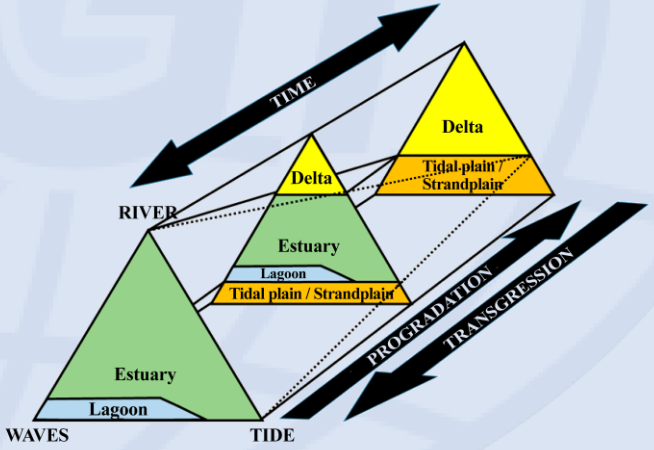
# Motivation




Holz, M. (2012). Estratigrafia de Sequências–Histórico, Princípios e Aplicações. Rio de Janeiro, editora Interciência.




Cooper, J. A. G., Meireles, R. P., Green, A. N., Klein, A. H., & Toldo, E. E. (2018). Late Quaternary stratigraphic evolution of the inner continental shelf in response to sea-level change, Santa Catarina, Brazil. Marine Geology, 397, 1-14.




Boyd, R., Dalrymple, R., & Zaitlin, B. A. (1992). Classification of clastic coastal depositional environments. Sedimentary Geology, 80(3-4), 139-150.)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# Objective

Establish an evolutionary model of the Babitonga Bay during the Late Quaternary.


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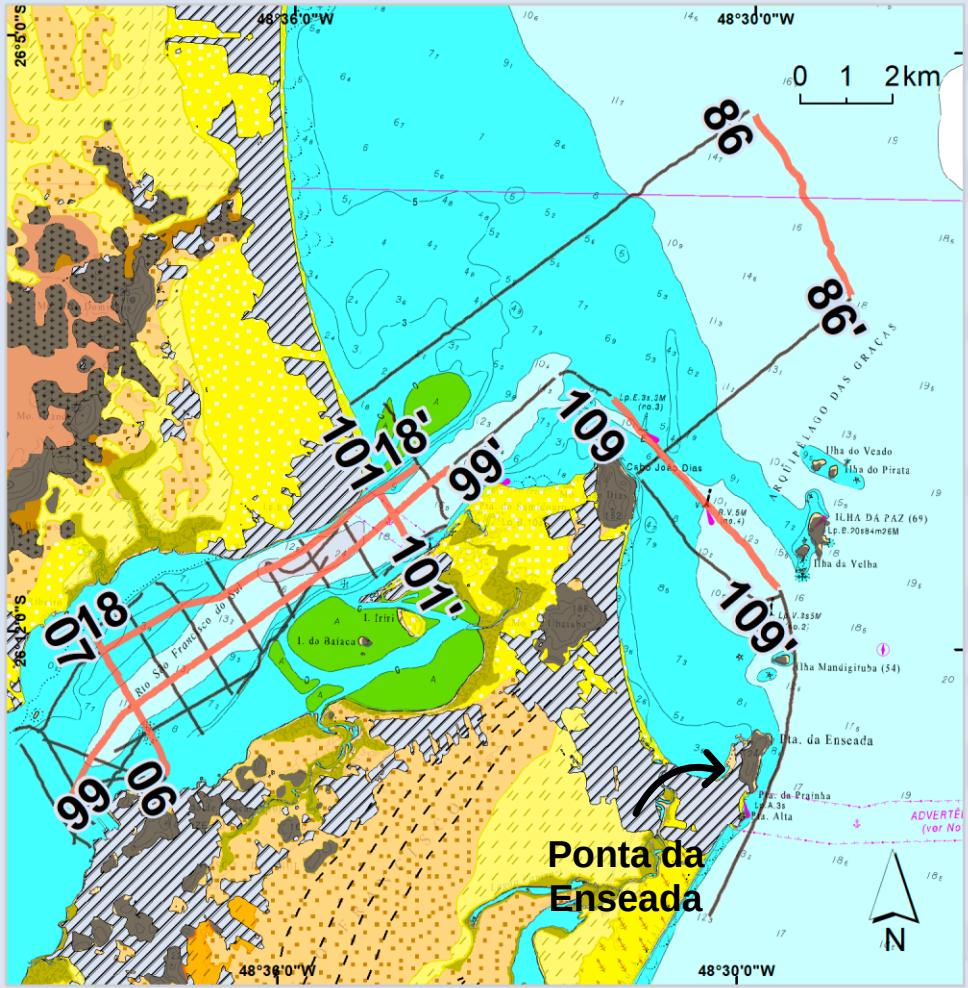
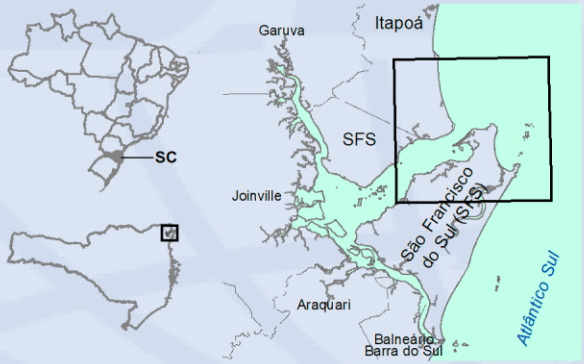
# Study area




- Sismica de alta resolução (0,5 - 7 kHz)
- Exemplos
- Cordões arenosos pleistocênicos
- Land use/cover (Esri 2020)
- Proterozóico inferior, Xistos e quartzitos
- Arqueano, Gnaisses granulíticos
- Proterozóico inferior, Granitóides deformados
- Holoceno, Depósito flúvio-lagunar
- Holoceno, Depósito flúvio-estuarino
- Holoceno, Depósito eólico
- Holoceno, Depósito lagunar
- Holoceno, Marinho
- Holoceno, Depósito paludial
- Pleistoceno, Depósito lagunar
- Pleistoceno, Depósito lagunar recoberto por marinho
- Pleistoceno, Marinho
- Quaternário indiferenciad, Depósito aluvial
- Quaternário indiferenciad, Depósito coluvial

**Cordões arenosos**: Posamentier et al., 2010
**Geologia**: CPRM
**Batimetria**: Centro de Hidrografia da Marinha (Carta nº 1830)




**Babitonga Bay mouth**

Northern coast of Santa Catarina

Coastal plain:

- beach ridges;
- dunes;
- coastal lagoon;
- headlands.

Wave-dominated estuary;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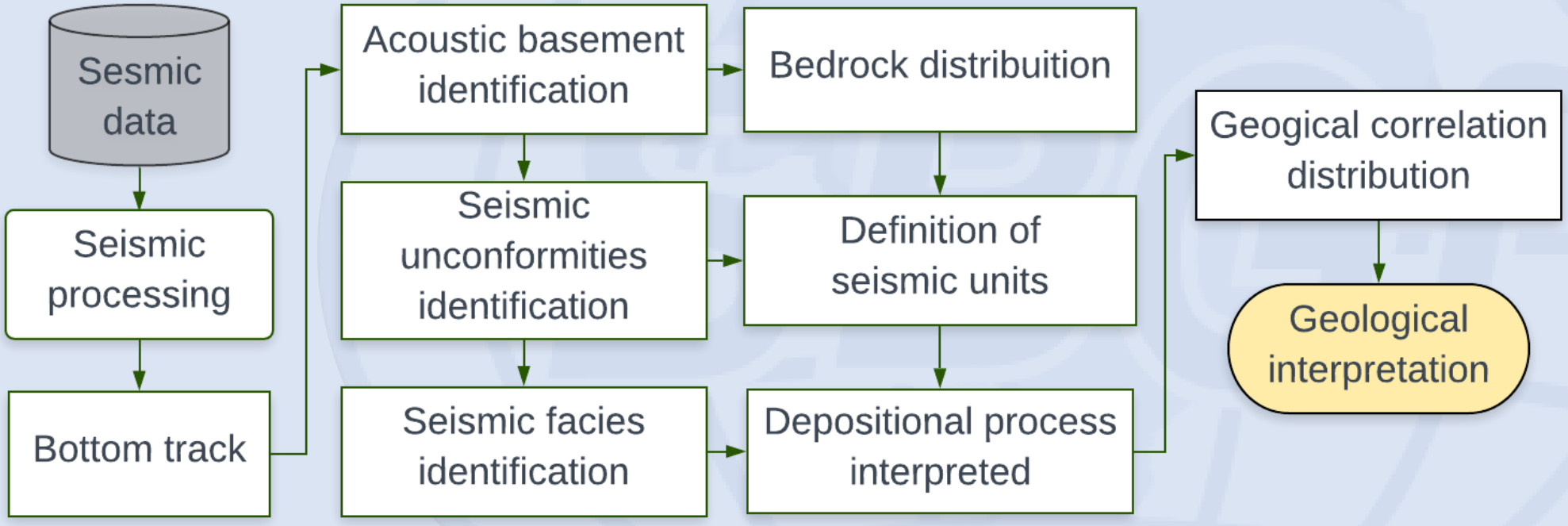
# Methodology





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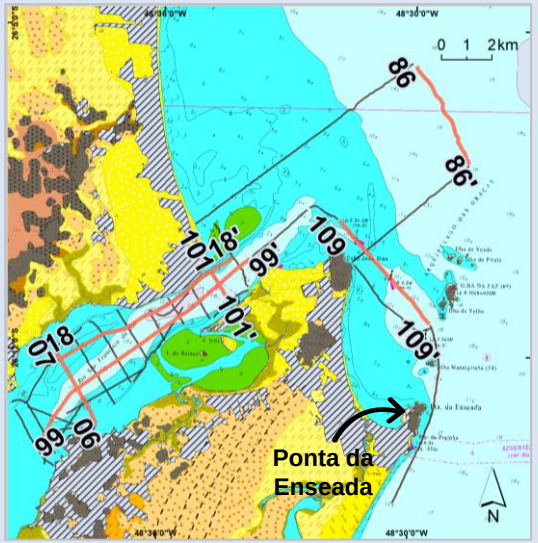
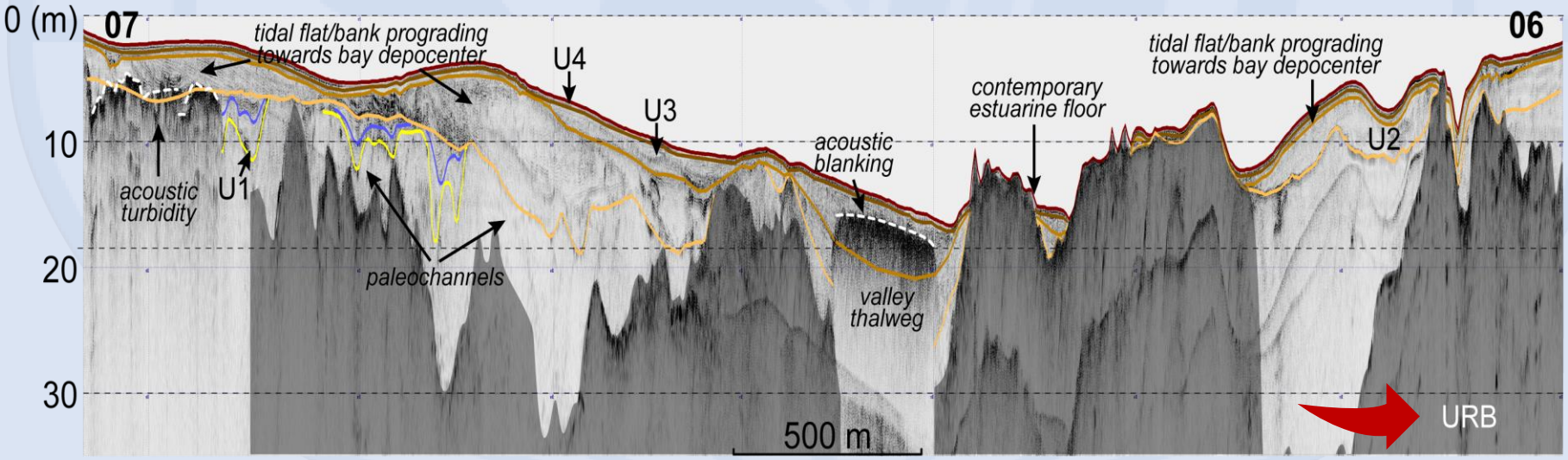
# Results

| Seismic Unconformity | Seismic Unit | Seismic Facies | Interpretation | |
|---|---|---|---|---|
| | | | *Inside the bay* | *outside the bay* |
| RB | URB | Trasparent. | Rocky basement. Same origin of the rocky mountains that occurs near the bay, at the Itapoá and at São Francisco do Sul cities. | |





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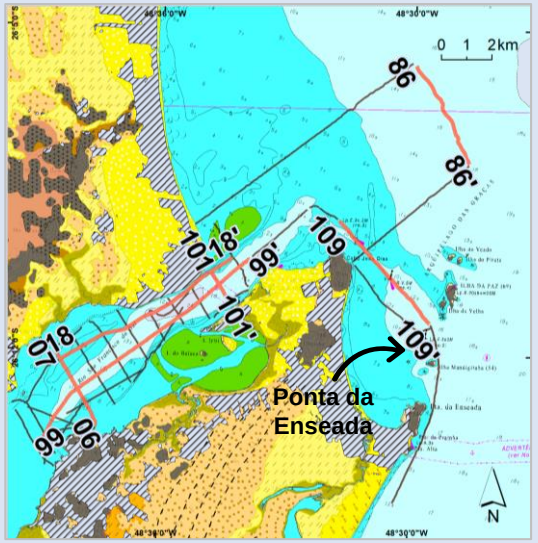
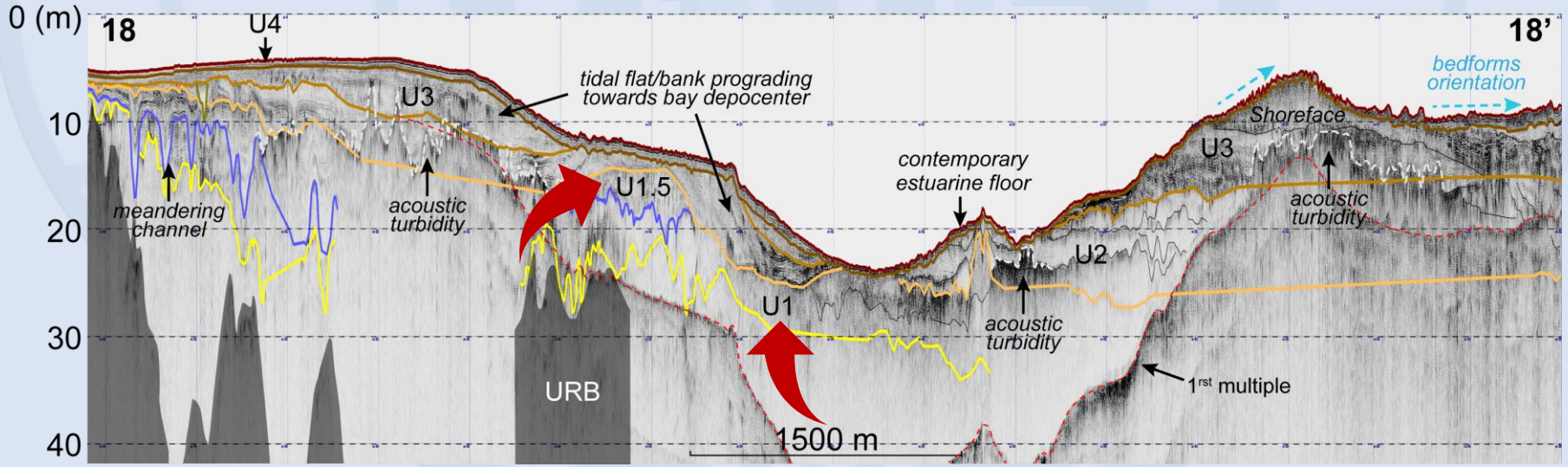
# Results

| Seismic Unconformity | Seismic Unit | Seismic Facies | Interpretation | |
|---|---|---|---|---|
| | | | *Inside the bay* | *outside the bay* |
| R1 | U1 | Transparent OR chaotic reflectors. | ? | ? |
| R1.5 | U1.5 | Chaotic reflectors;<br>Medium to high amplitude, subparallel reflectors;<br>Medium to high amplitude, concave-up reflections;<br>Low amplitude, concave-up reflections. | Channel infill/Channel lateral migration/Channel meanders occurring at the bay-head delta. | Incised valley at NW of the main channel mouth. |





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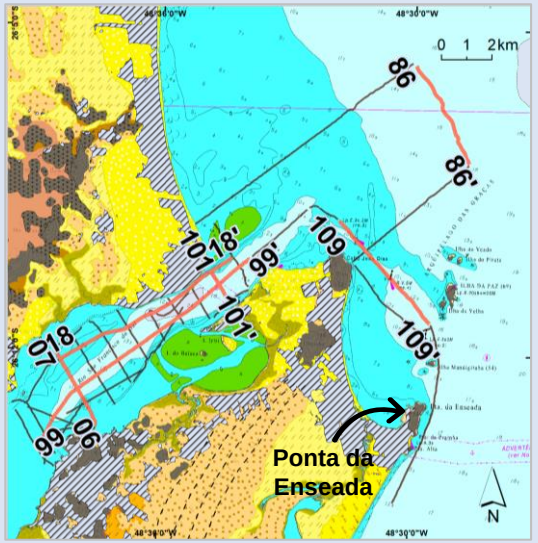
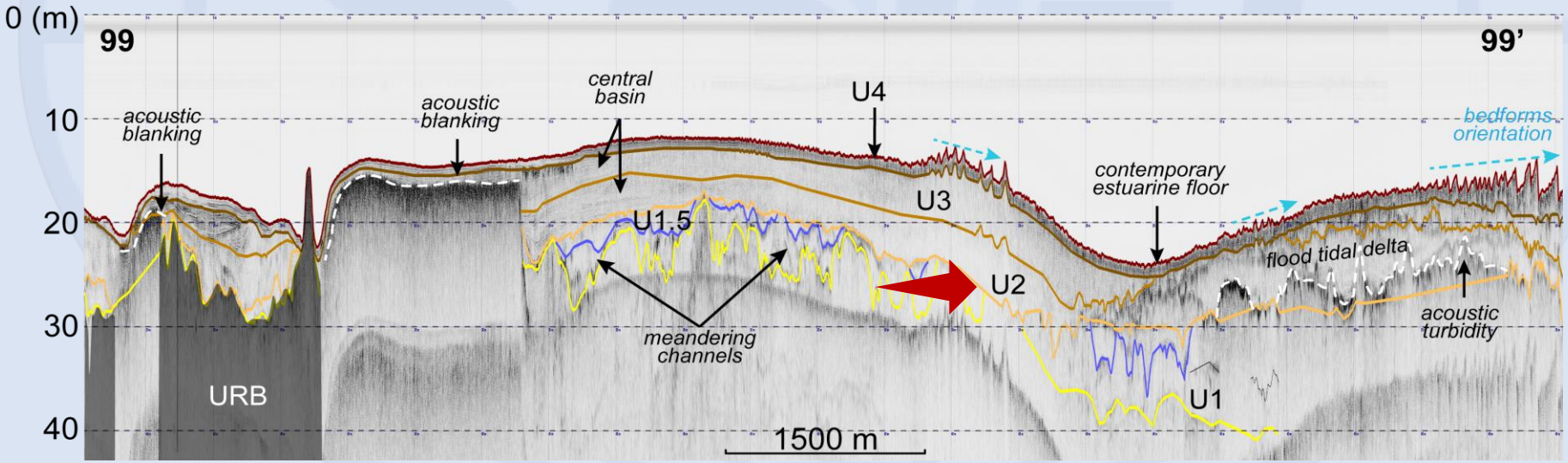
# Results

| Seismic Unconformity | Seismic Unit | Seismic Facies | Interpretation | |
|---|---|---|---|---|
| | | | *Inside the bay* | *outside the bay* |
| R2 | U2 | Low to high amplitude, subparallel reflectors;<br>Low to high amplitude, sigmoidal to oblique-tangential reflectors. | Tidal flats at the margins of the paleobay, that may migrate to the bay's depocenter as prograding clinoforms;<br>Central basin;<br>Flood tidal delta. | Mouth bar in front of Itapoá side of the mouth bay;<br>Backbarrier lagoon infill. |





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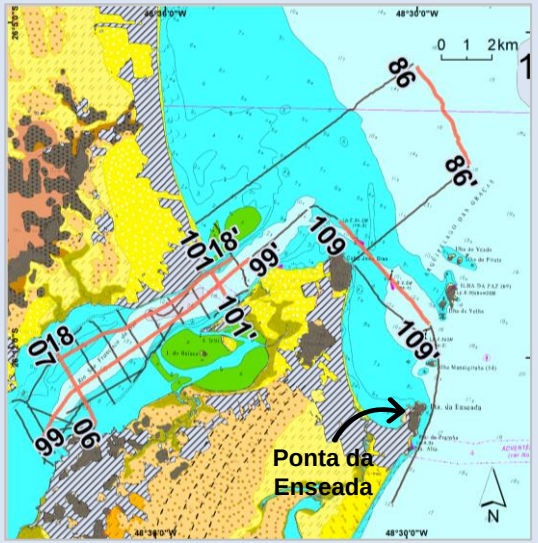
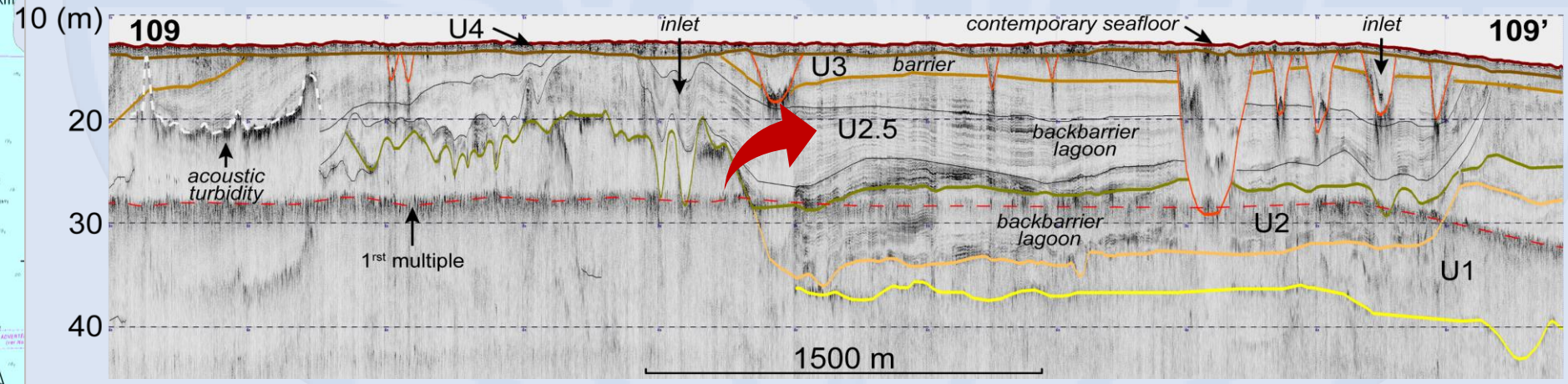
# Results

| Seismic Unconformity | Seismic Unit | Seismic Facies | Interpretation | |
|---|---|---|---|---|
| | | | *Inside the bay* | *outside the bay* |
| R2.5 | U2.5 | Transparent;<br>Medium amplitude, high frequency, subparallel;<br>Medium amplitude, High frequency, concave-up divergent infill reflections. | Tidal delta channel. | Incised valley at NW of the main channel mouth;<br>Barrier and backbarrier lagoon infill. |





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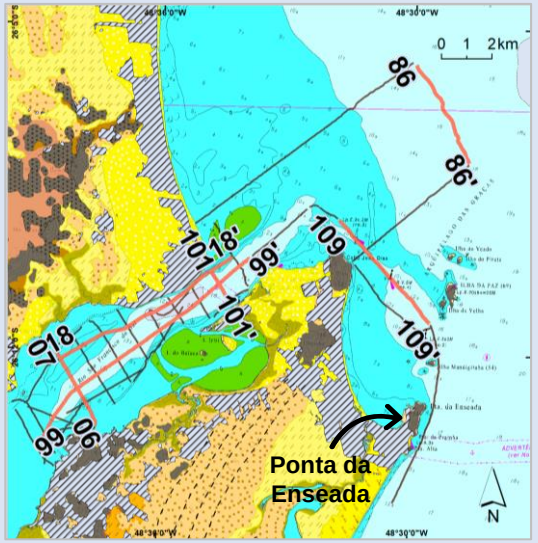
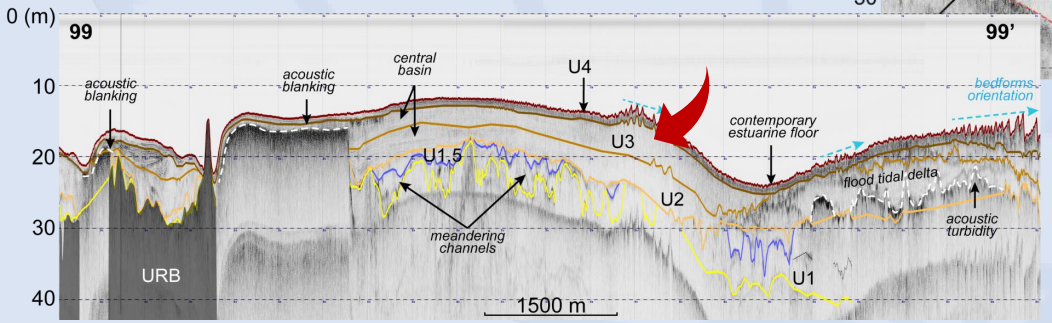
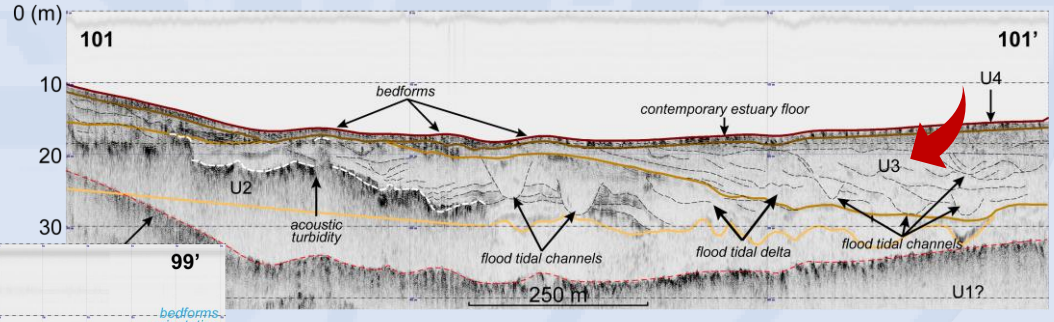
# Results

| Seismic Unconformity | Seismic Unit | Seismic Facies | Interpretation | |
|---|---|---|---|---|
| | | | *Inside the bay* | *outside the bay* |
| R3 | U3 | Trasparent;<br>Low to high amplitude, subparallel reflectors;<br>Low to high amplitude, sigmoidal to oblique-tangential reflectors;<br>Shallow gas features. | Tidal flats neat the margins;<br>Tidal bar between the central basin and the NW margin next to the Itapoá and SFS cities;<br>Central basin;<br>Flood tidal delta at the Baiacu and Iriri Islands;<br>Shoreface near Itapoá city margin. | Mouth bar in front of Itapoá side of the mouth bay;<br>Ebb tidal delta at the mouth bay;<br>Anchored barrier in the rocky basement in front of the headland *Ponta da Enseada*;<br>Shoreface. |





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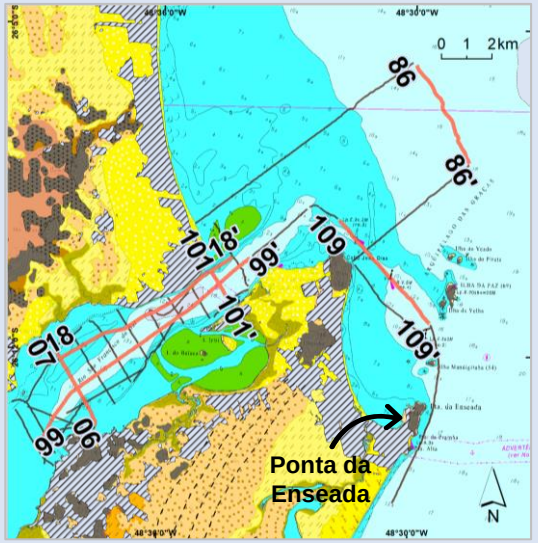
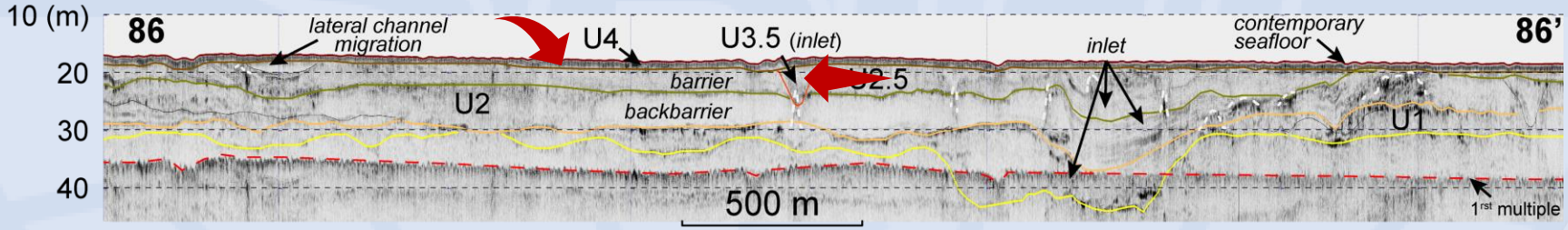
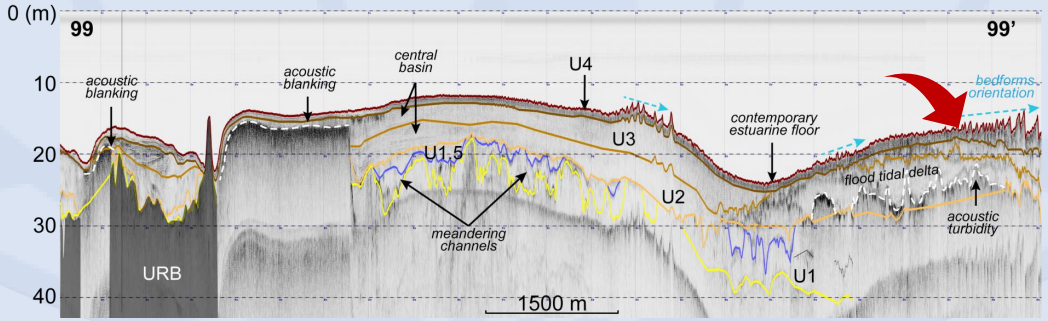
# Results

| Seismic Unconformity | Seismic Unit | Seismic Facies | Interpretation | |
|---|---|---|---|---|
| | | | *Inside the bay* | *outside the bay* |
| R3.5 | U3.5 | Trasparent. | N/A | Inlet infill. |
| R4 | U4 | High almplitude, high frequency, subparallel reflectors;<br>High almplitude, high frequency, up-convex reflectors, assimetrical mound-shape;<br>Shallow gas features. | Contemporary tidal flats, central basin, flood tidal delta;<br>Bedforms (sand waves). | Contemporary ebb tidal delta;<br>Contemporary seafloor. |





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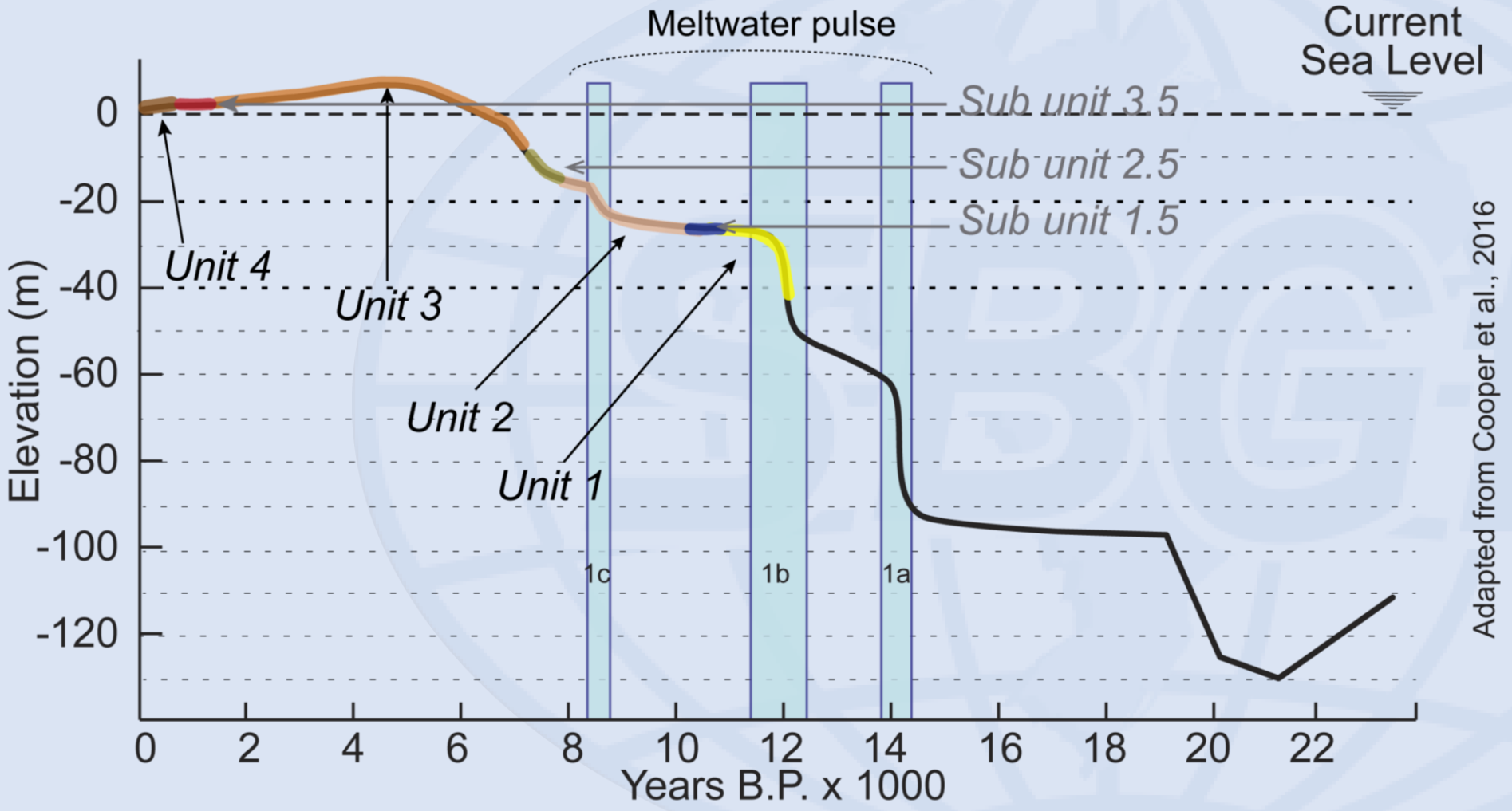


Cooper, J. A. G., Green, A. N., Meireles, R. P., Klein, A. H., Souza, J., & Toldo, E. E. (2016). Sandy barrier overstepping and preservation linked to rapid sea level rise and geological setting. Marine Geology, 382, 80-91.


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# Conclusions

## Objective

Establish an evolutionary model of the Babitonga Bay during the Late Quaternary.

## Conclusions

- ✓ The accommodation space is defined by the rocky basement;
- ✓ Presence of an environment protected by barriers in the region adjacent to the coast. Such a system of barriers was probably formed from sandy ridges anchored at Ponta da Enseada and on the islands to the north;
- ✓ The flood tide delta was in the region of the mouth before.
- ✓ Gas accumulation occurs mainly in the most recent transgressive deposits (U3);
- ✓ Bedforms occur at the mouth and other places of greater hydrodynamic energy, indicating the predominant direction of bedload;


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# Thankyou very much for your attention

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CNPq - **SUBIDA DO NÍVEL DO MAR E A BAÍA DA BABITONGA: UMA ABORDAGEM ECO-MORFODINÂMICA PARA PREVER E MITIGAR IMPACTOS** (n° 441545/2017-3), included in the project **OUTRAS BAÍAS DO BRASIL.**

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