

# Late Quaternary climatic variability in northern Patagonia Argentina: information from modern and fossil shells of *Amiantis purpurata* (Bivalvia, Veneridae)



Bayer MS<sup>1</sup>, Brey T<sup>2\*</sup>, Beierlein L<sup>2</sup> and Gordillo S<sup>1</sup>

1: Centro de Investigaciones en Ciencias de la Tierra, Universidad Nacional de Córdoba, Av Vélez Sarsfield 1611, CPX5016GCA Córdoba. Argentina.

2: Alfred-Wegener-Institut, PO Box 120161, 27515 Bremerhaven, Germany.



## Study area



*Amiantis purpurata*

This species is a typical warm-temperate water species distributed from southern Brazil to northern Patagonia, Argentina.

The southernmost known population of this species is at SMG, where occurs in high densities.

Individuals from SMG are slow growing and can live for over 40 years.

Morsan, 2003  
Morsan and Kroeck, 2005

San Matías Gulf (today)  
SMG

Restricted water circulation

High rates of evaporation

High summer air temperature (33 - 40°C)

Lack of natural freshwater inputs

Piola and Scasso, 1988  
Rivas and Beier, 1990

**Objective:** to reconstruct climate changes during the Late Quaternary based on sclerochronological analysis of *A. purpurata* from San Matías Gulf, northern Patagonia Argentina.

## Material and Method

Recent and well preserved fossil specimens of *A. purpurata*  
Comparative analysis of stable isotopic profiles of  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$



Interglacial Pleistocene  
MIS 5, 100 ka BP



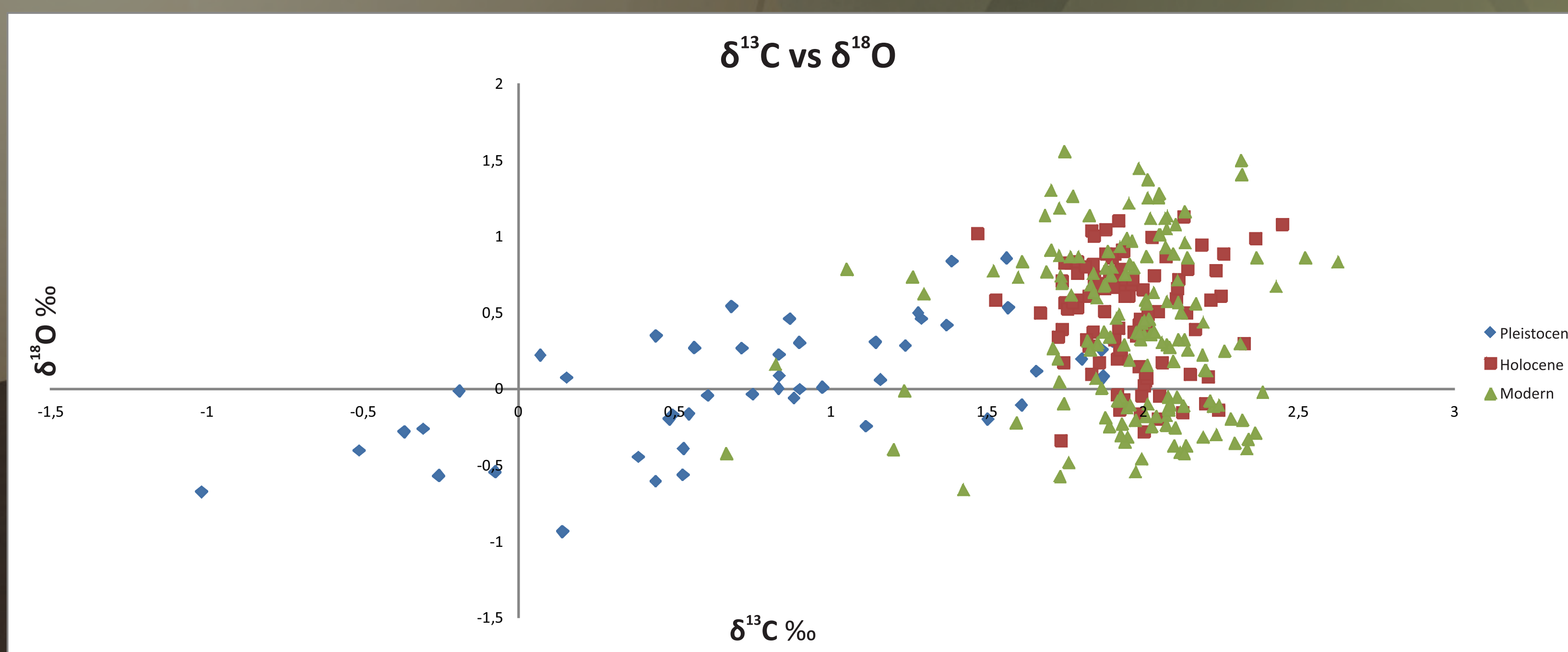
Holocene  
shell age 3630 ± 100 years BP



Modern shell

## Results

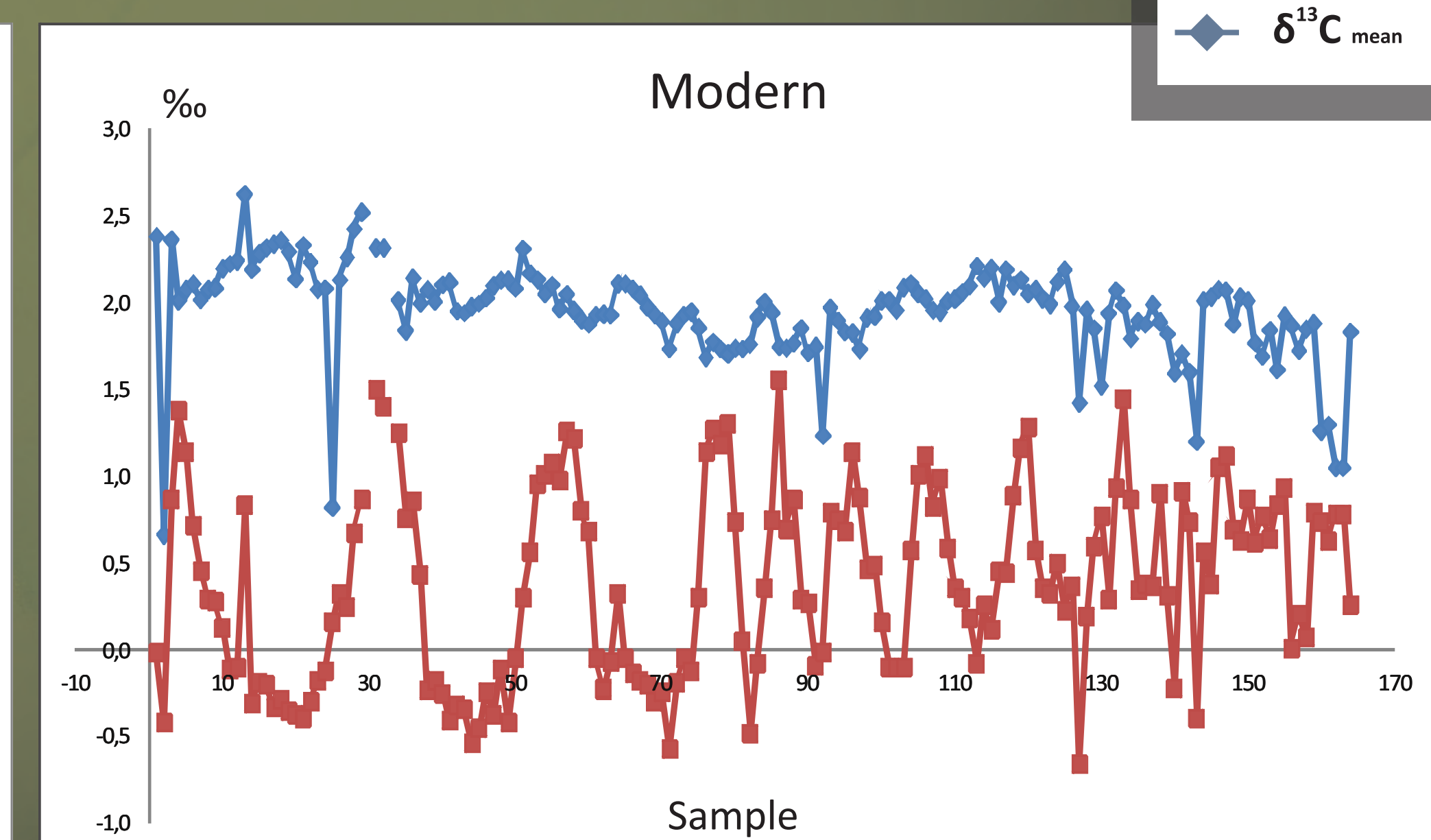
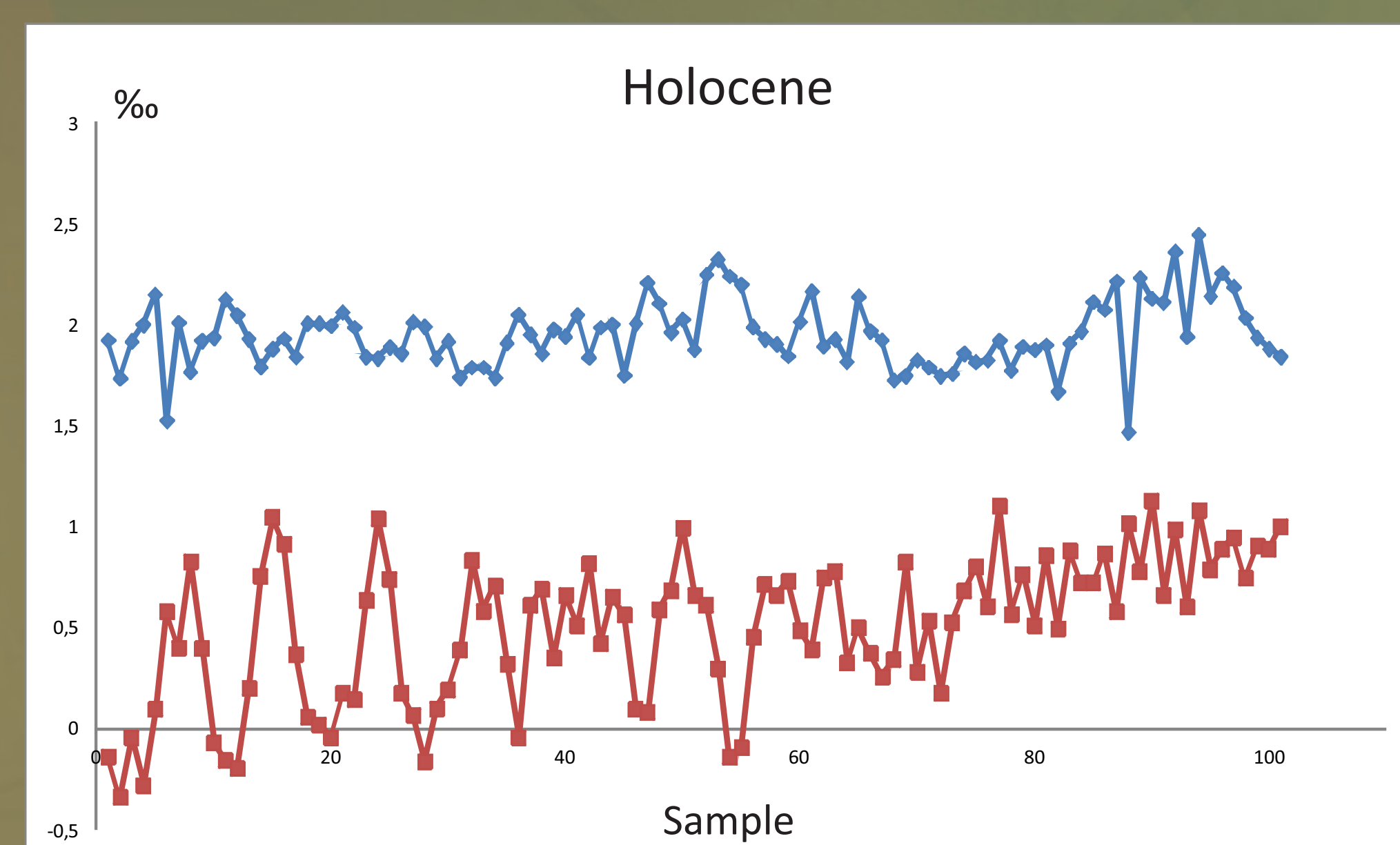
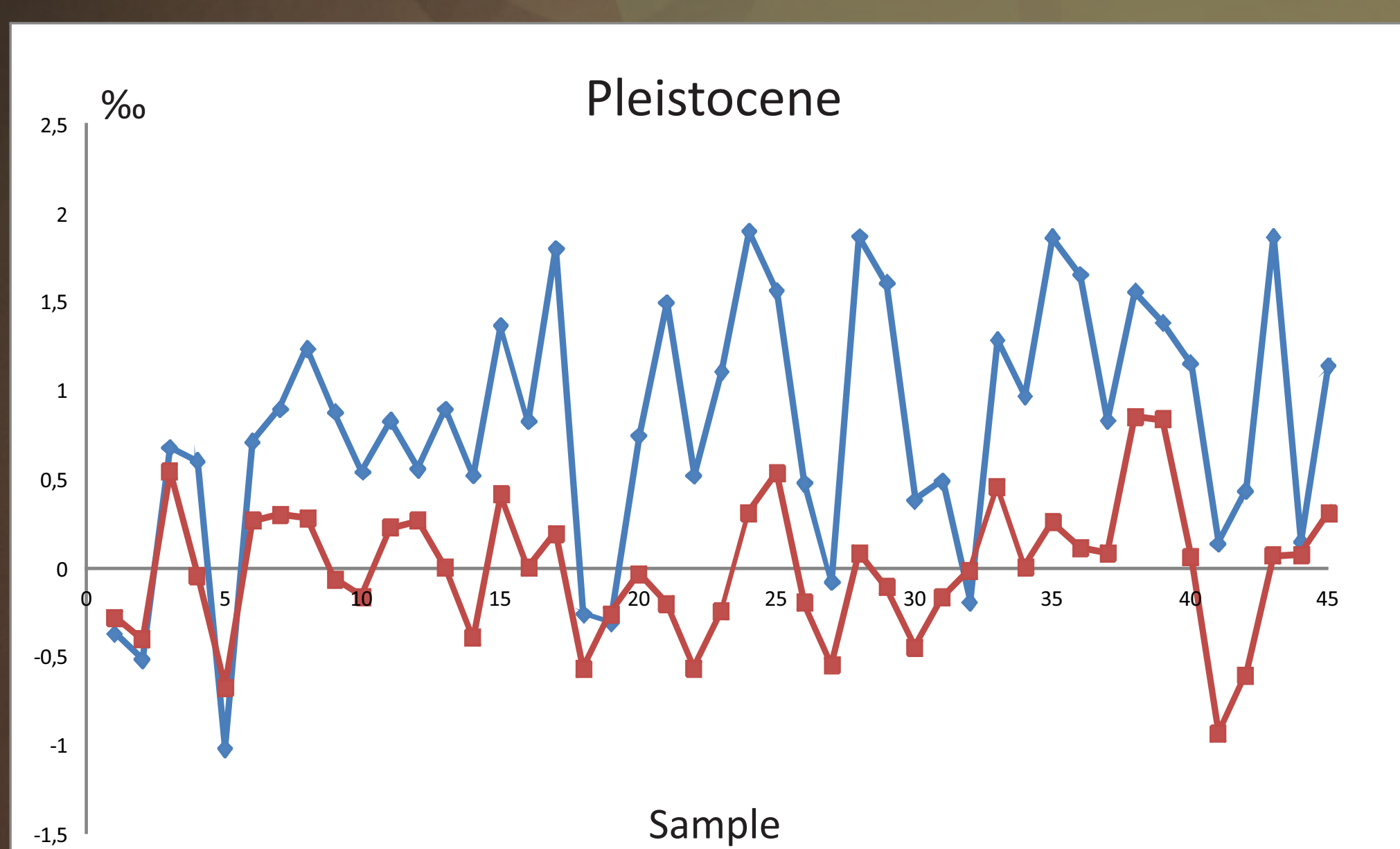
### Values range



	$\delta^{18}\text{O}$	$\delta^{13}\text{C}$
Pleistocene	-0,93‰ to 0,85‰	-1,02‰ to 1,9‰
Holocene	-0,34‰ to 1,13‰	1,45‰ to 2,44‰
Modern	-0,66‰ to 1,56‰	0,7‰ to 2,6‰

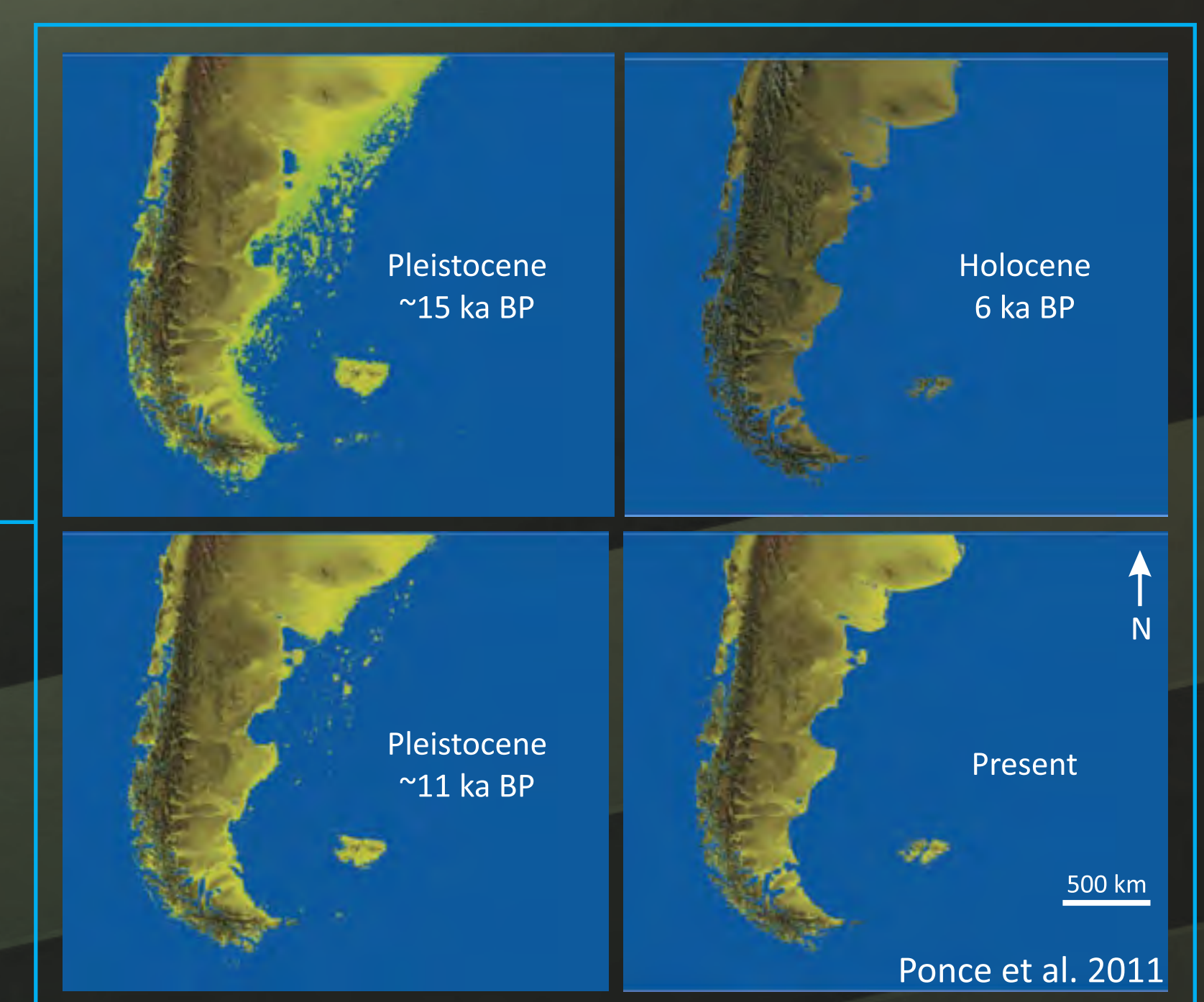
	$\Delta\delta^{18}\text{O}$	$\Delta\delta^{13}\text{C}$
Pleistocene	1,76‰	2,92‰
Holocene	1,47‰	0,98‰
Modern	2,22‰	1,9‰

■  $\delta^{18}\text{O}$  mean  
◆  $\delta^{13}\text{C}$  mean



- $\delta^{18}\text{O}$  values indicate warmer waters in Pleistocene than Holocene and Recent
- The intra-annual  $\delta^{18}\text{O}$  shell temperature is higher today compared to Holocene and Pleistocene
- Seasonality was observed during the Quaternary from San Matías Gulf
- Pleistocene  $^{13}\text{C}$  values were different from Holocene and today → changes in ocean circulation

San Matías Gulf would have been formed approaching 12 ka BP (12,000 years; after MIS 5, Ponce et al. 2011)



## Conclusions

Our findings indicate that *A. purpurata* is a suitable candidate for detailed paleoenvironment reconstructions in North Patagonia.

*Amiantis purpurata* showed a clear marine environment but with a difference in sea surface temperature and ocean circulation in northern Patagonia through the Late Quaternary.