

The bivalve *Tawera gayi*, a potential archive of southern South America Holocene climate variability

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The venerid *Tawera gayi* could be a suitable Holocene bioarchive for Southern South-America given that it is found in a wide distribution range from the Beagle Channel (54° 50' S) to 33° S along the Pacific coast, and to the North Patagonia (36°S) in the South Atlantic. In the Beagle Channel, both extant *T. gayi* populations and shell beds of mid-Holocene origin can be found. On the other hand there is reliable life history information in modern populations (Lomovasky et al. 2005 J. Appl. Ichthyol. 21, 64-69), i.e. shell growth patterns and the confirmation of the annual periodicity of the translucent bands. Finally, the shells provide geochemical proxies, e.g., $\delta^{18}O$ for temperature reconstruction.

Objective:

In order to investigate climate variability in the Beagle Channel, the individual age, growth increments and isotopes analyses of modern and fossil shells of *Tawera gayi* were used.

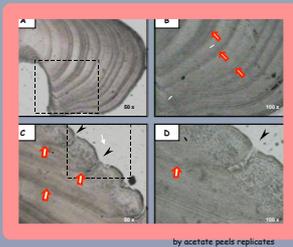


RESULTS AND DISCUSSION

MODERN

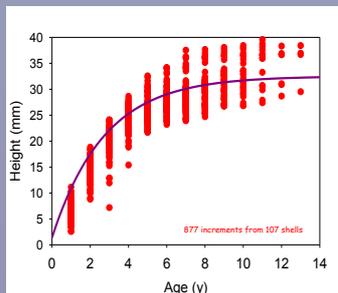


The shell growth pattern shown alternating narrow translucent and broad opaque bands



The translucent bands (arrows in acetate peels of modern shells and in fossil) corresponding to slow or halted growth are formed in winter

The parameters of the von Bertalanffy growth function were estimated to be:

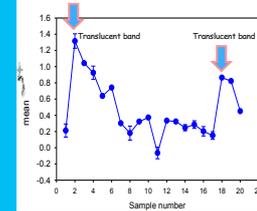


Population	H_{∞} (mm)	k (y^{-1})	t_0 (y)	n	H_{max} (mm)	Age_{max}
Modern	32.50 (31.07; 33.94)	0.37 (0.31; 0.42)	1.12 (0.98; 1.25)	877	40.39	13
Fossil	33.23 (31.94; 34.51)	0.24 (0.21; 0.27)	0.57 (0.44; 0.69)	500	40.05	13

The comparison by maximum likelihood method showed:

H_{∞} growth rate k no difference
modern difference with higher values ($p < 0.05$) in
 t_0 modern difference with higher values ($p < 0.05$) in

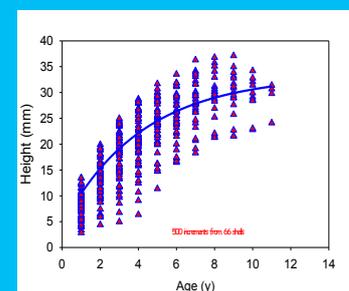
FOSSIL



We correlated the most positive $\delta^{18}O$ values with winter forming the translucent bands and the most negative $\delta^{18}O$ with summer.

Radiocarbon dating revealed ages ranging between ca 3800 to 4400 years b.p. corresponding to the

Holocene Climatic Optimum



CONCLUSIONS

This study demonstrated that this species clearly exhibited annual cycles showing seasonality patterns from the mid-Holocene to the present with translucent bands corresponding to slow or halted growth formed in fall/winter; the growth rate was lower during the past warm epochs than the present possible related to a different productivity in the Beagle Channel and/or a lower metabolic rate of the clams exposed to a higher temperature.