REVISED ~2000-YEAR CHRONOOSTRATIGRAPHY OF PARTIALLY VARVED MARINE SEDIMENT IN SANTA BARBARA BASIN, CALIFORNIA

Arndt Schimmelmann\textsuperscript{a}, Ingrid L. Hendy\textsuperscript{b}, Larianna Dunn\textsuperscript{b}, and Dorothy K. Pak\textsuperscript{c}

\textsuperscript{a} Indiana University, Department of Geological Sciences, Bloomington, IN 47405
\textsuperscript{b} University of Michigan, Department of Geological Sciences, Ann Arbor, MI 48109
\textsuperscript{c} University of California at Santa Barbara, Marine Science Institute, Santa Barbara, CA 93106

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Source of bathymetry maps: Monterey Bay Aquarium Research Institute (MBARI)
Soutar box corer
Kasten cores lose the topmost and softest sediment. Recovery is good between ca. 100 BC and 1850 AD.

Even deeper cores require piston coring.
~2,000-yr record of fish scale abundance reflects the size of fish stocks

John Isaacs and Andrew Soutar started varve-counting in the 1960s to reconstruct fish stocks.

The 1940s collapse of the California sardine fisheries was not caused solely by overfishing. Fish stocks naturally fluctuate through time.

http://www.calcofi.org/publications/calcofireports/v33/Vol_33_Baumgartner_etal.pdf
A slice of sediment from a kasten core, 85 cm depth-in-core:

- ca. 70 wt. % water
- ca. 2.5 wt. % organic C

~1108 AD
grey turbidite
Gastropod on the sediment surface in 1988
- Laminated or even varved sediment record
- Can be cored reproducibly
- Can be correlated
Age versus depth in core 6P. The line connecting individual “varve-count” ages (open circles) is bracketed by two dashed lines that illustrate the decreasing confidence in “varve count” ages with increasing depth.

Adapted from: Schimmelmann et al. (2006), *Journal of Sedimentary Research* 76, 74-80.
http://dx.doi.org/10.2110/jsr.2006.04
Comparison between traditional varve-count dates (gray crosses, Schimmelmann et al. 2006) and terrestrial radiocarbon dates (squares, calibrated using IntCal09) generated from seeds, leaves, twigs and charcoal. Closed squares represent samples used in the age model. Open squares display samples which fall off the age-depth line and were not used in the age model. One unreliable radiocarbon age (7700 years BP) was not plotted. Instrumental errors are displayed on the radiocarbon dates as bars. Kasten core depth has been corrected by the removal of instantaneous sedimentary events such as turbidites and flood layers.
Fig. 1. Location map for Santa Monica and San Pedro Basin and vicinity, California Continental Borderland.
