

Impact of climate change on hard corals of Lakshadweep islands

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SST
Salinity
Upwelling

ENSO, IOD
Monsoons

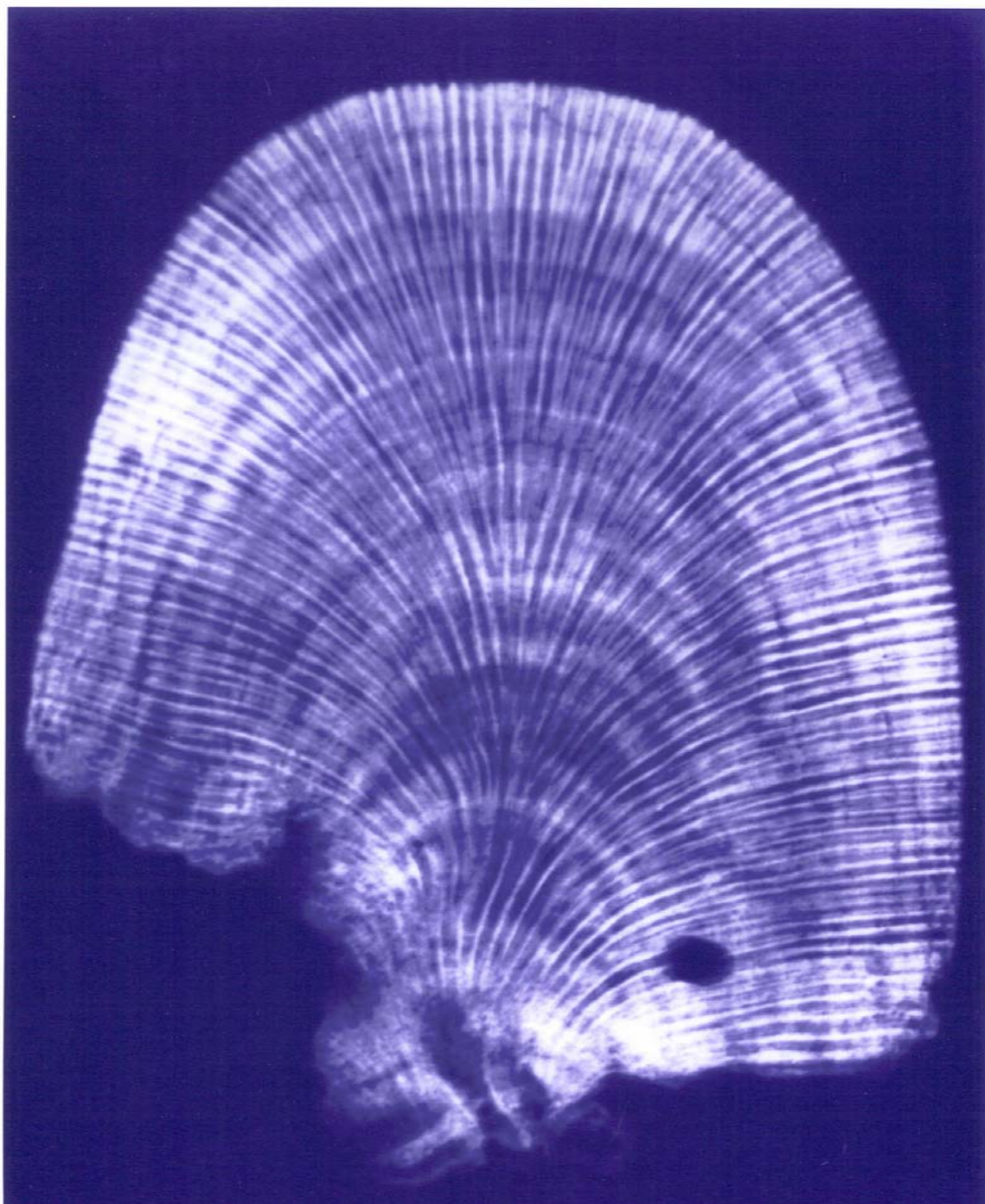
CORALS

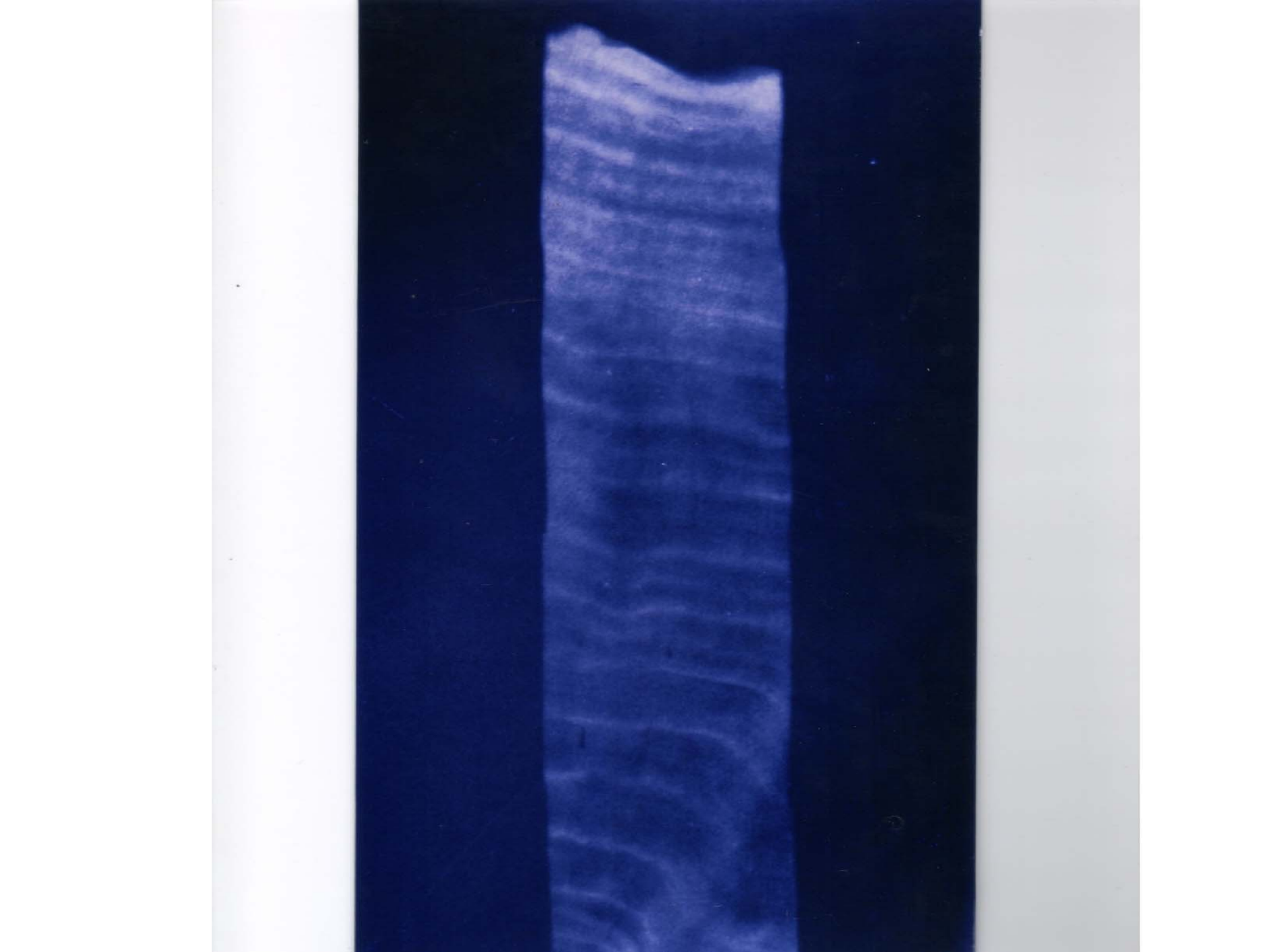
Monthly &
Seasonal records
Holocene Climate

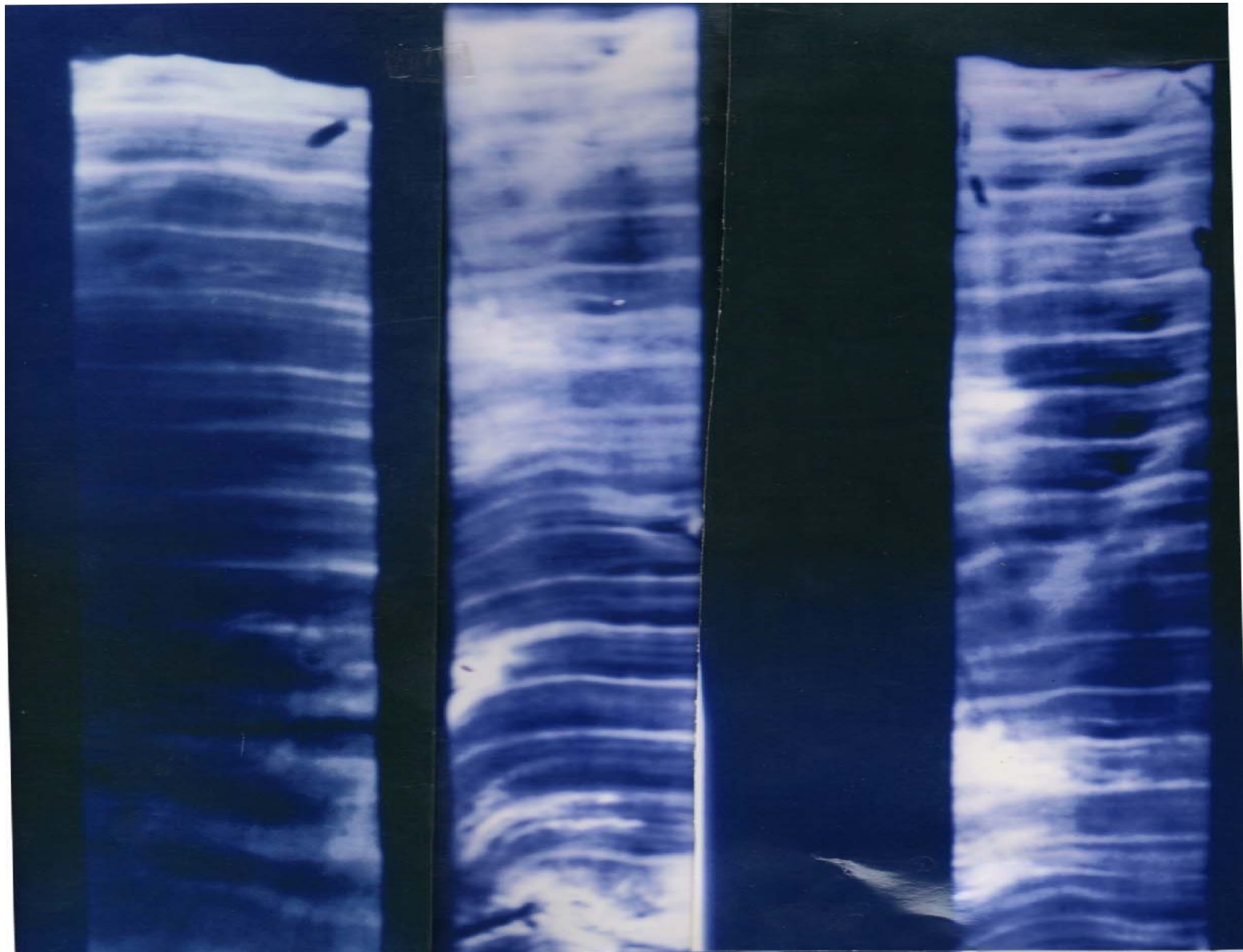
Greenhouse gas
variations
Sea level changes











Equations used for calculating SST:

For summer months:

$$T (^{\circ}\text{C}) = 3.0 - 4.88 (\delta^{18}\text{O}_{\text{coral}} - 0.28)$$

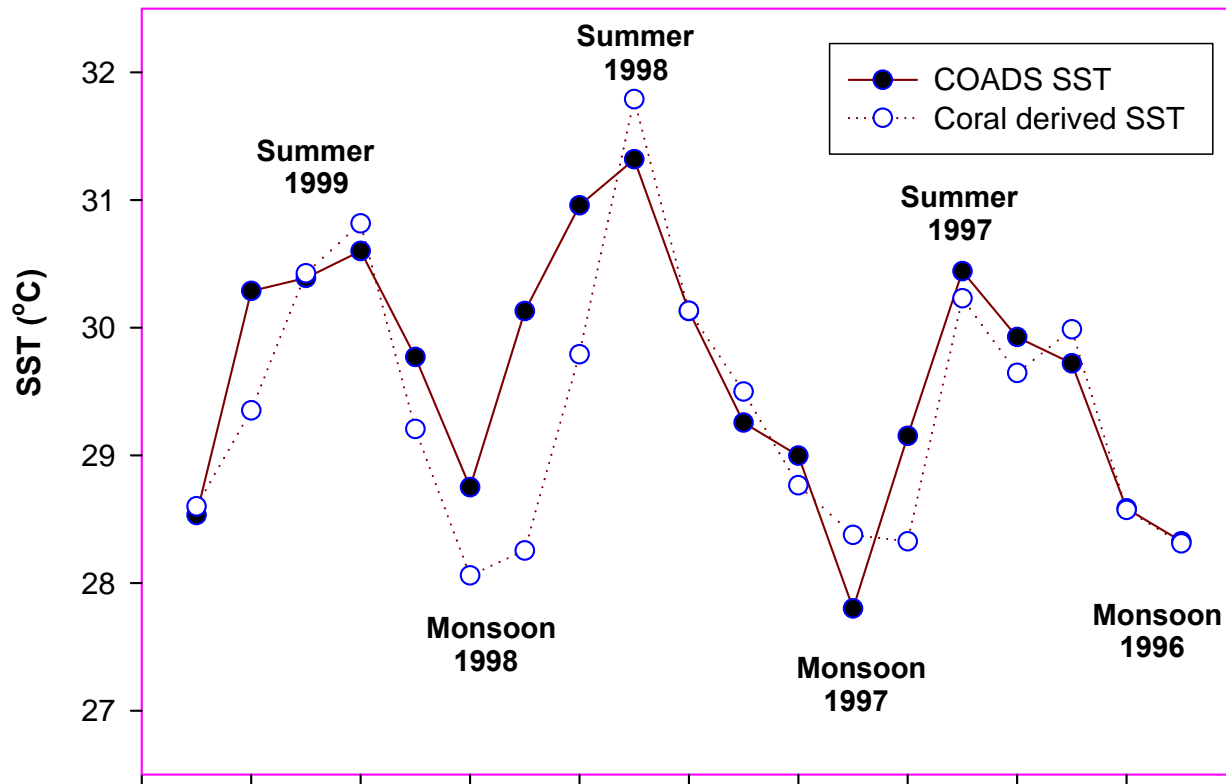
For monsoon months:

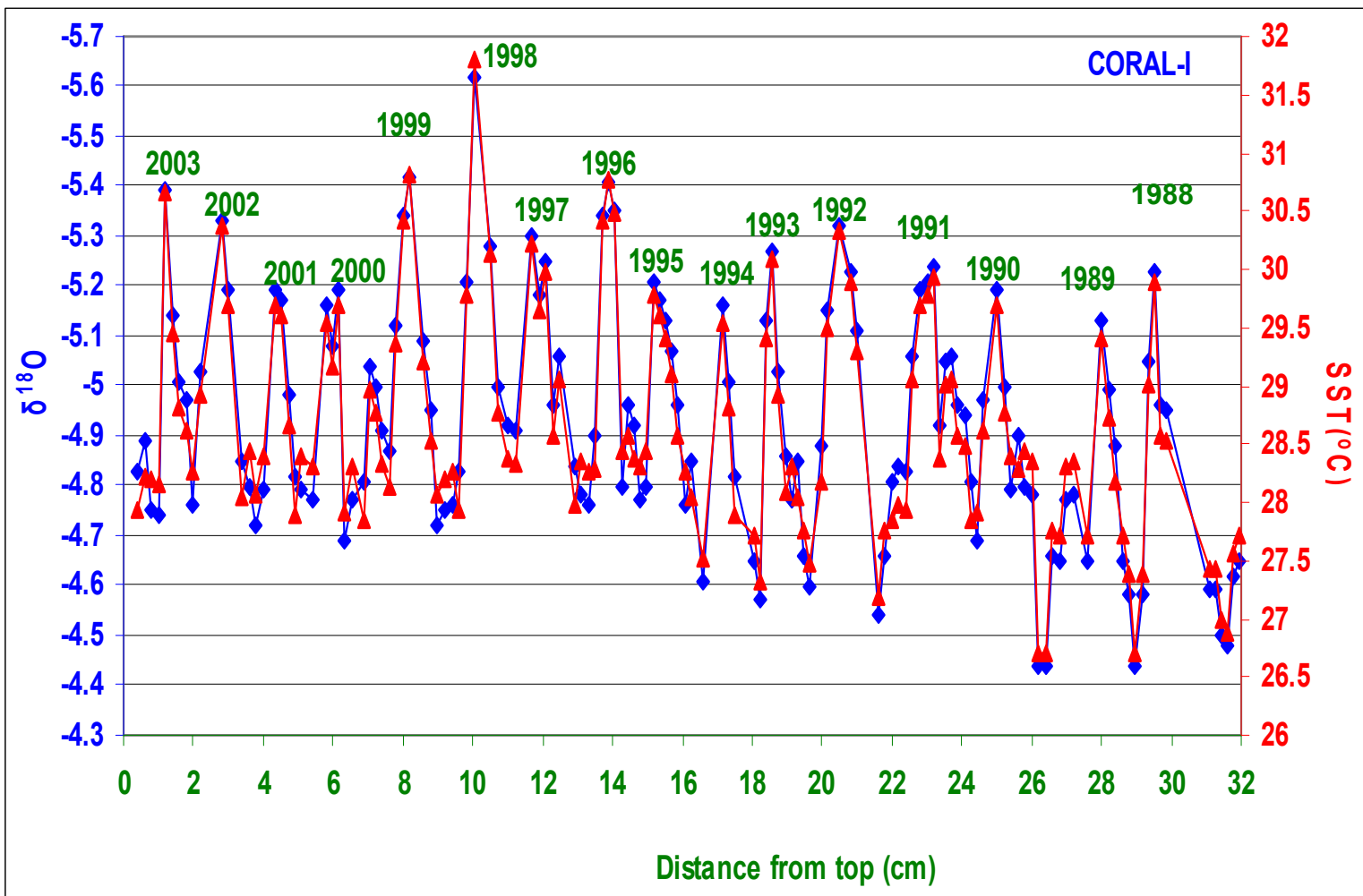
$$T (^{\circ}\text{C}) = 3.0 - 4.88 (\delta^{18}\text{O}_{\text{coral}} - 0.415)$$

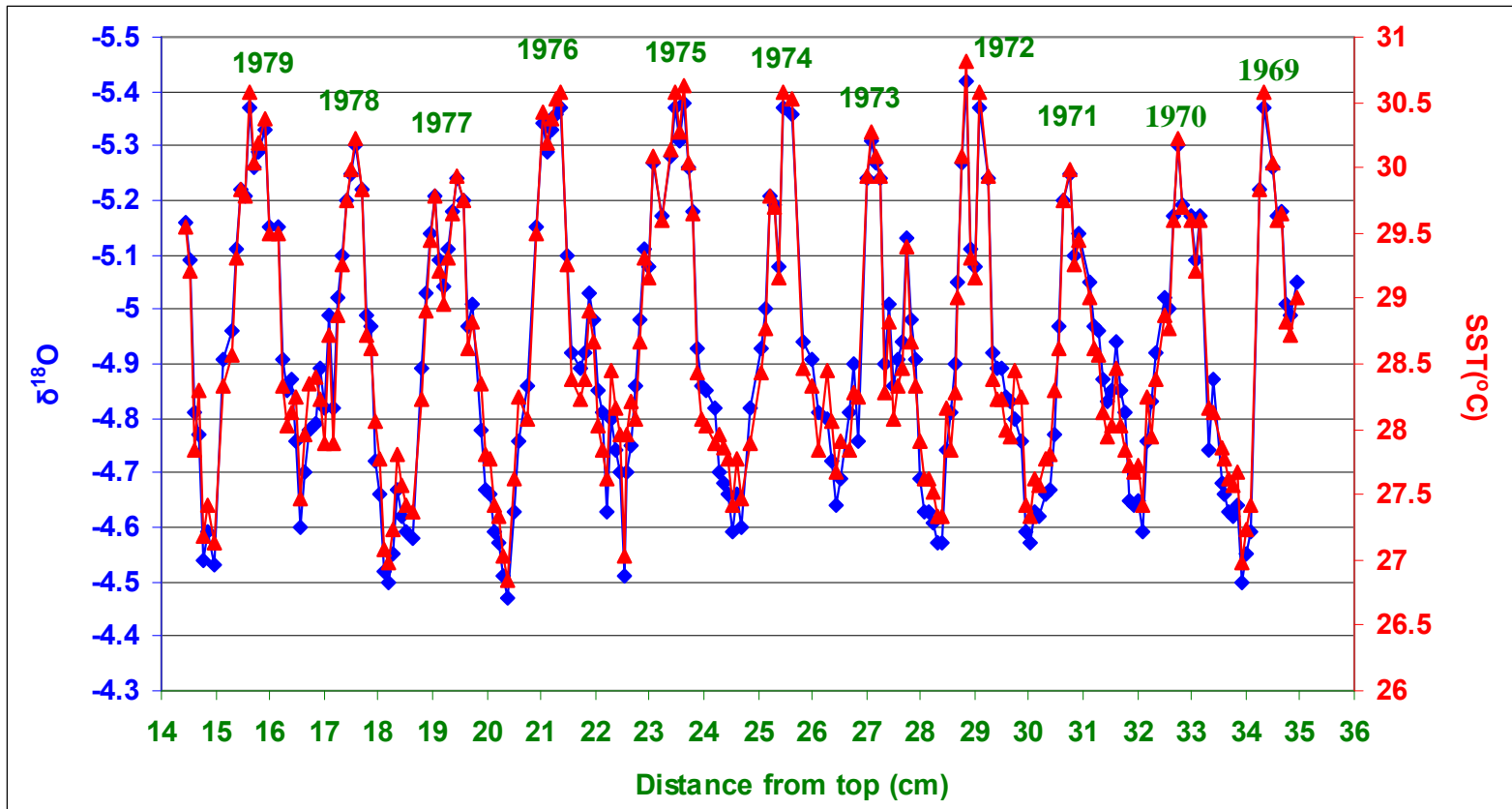
$$\delta^{18}\text{O} = \left\{ \left[\frac{^{18}\text{O}/^{16}\text{O}_{\text{sam}} - ^{18}\text{O}/^{16}\text{O}_{\text{std}}}{^{18}\text{O}/^{16}\text{O}_{\text{sam}} - ^{18}\text{O}/^{16}\text{O}_{\text{std}}} \right] - 1 \right\} \times 10^3$$

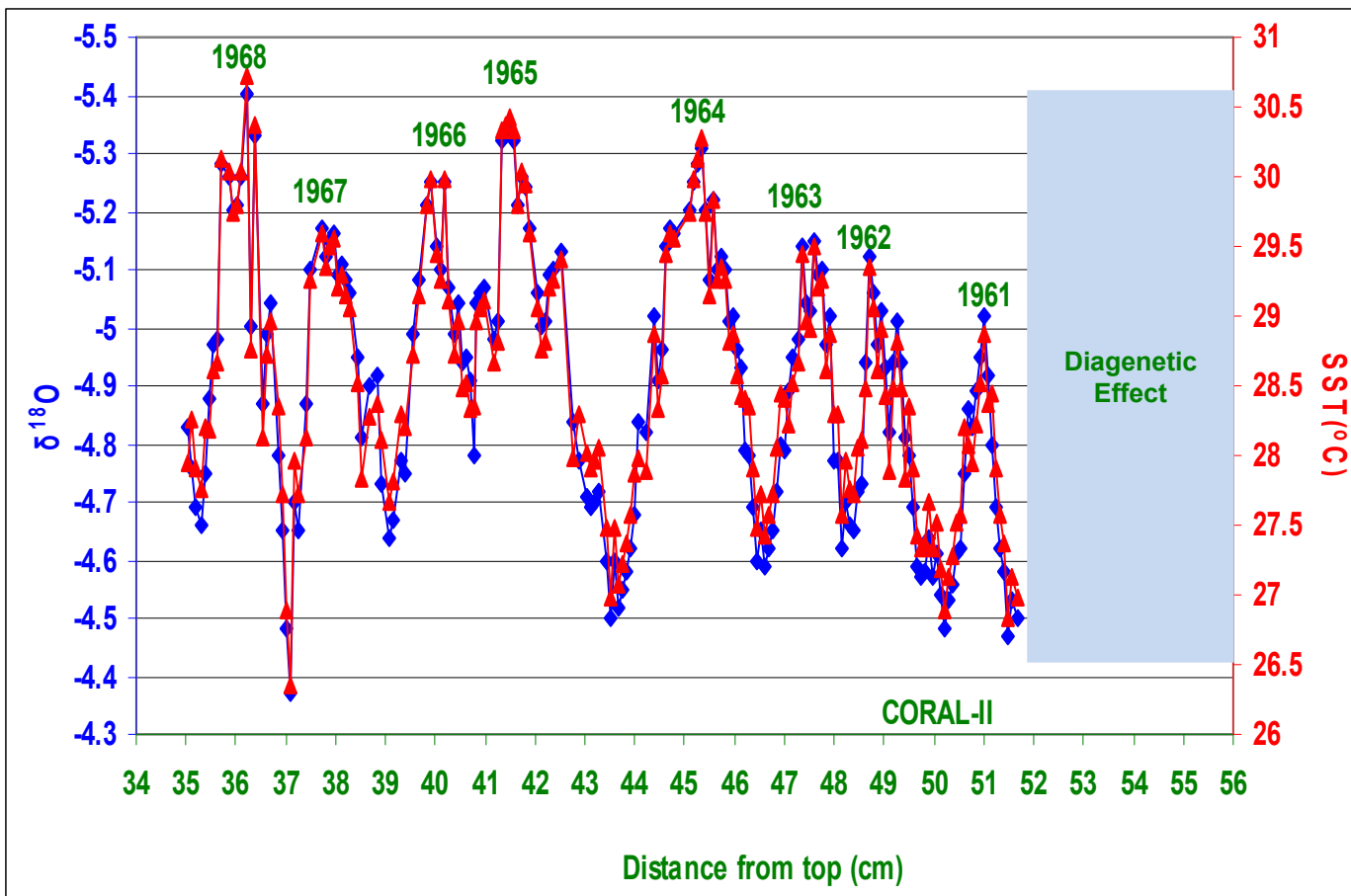
Ref.: Chakraborty and Ramesh (1993)

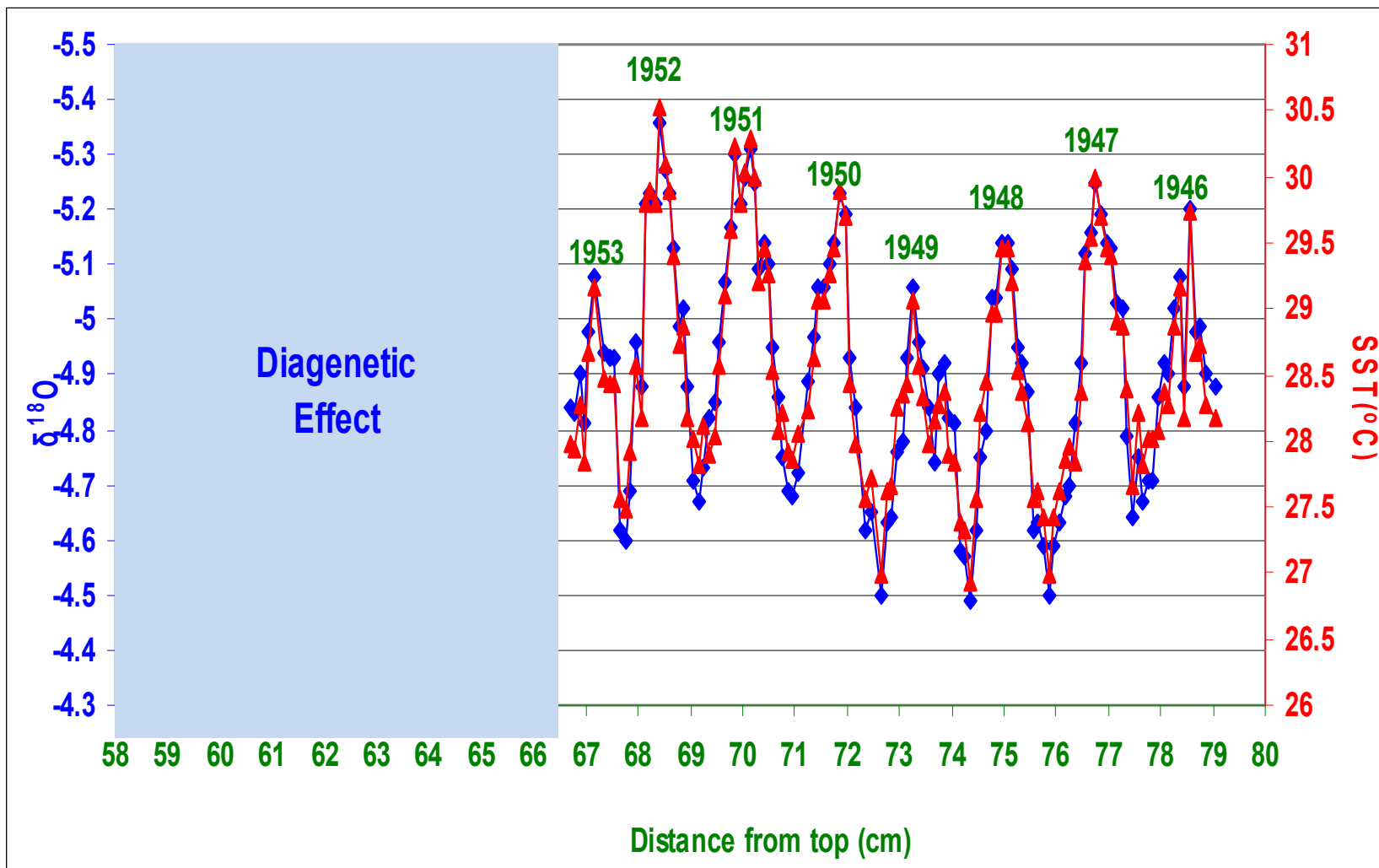
Terra Nova

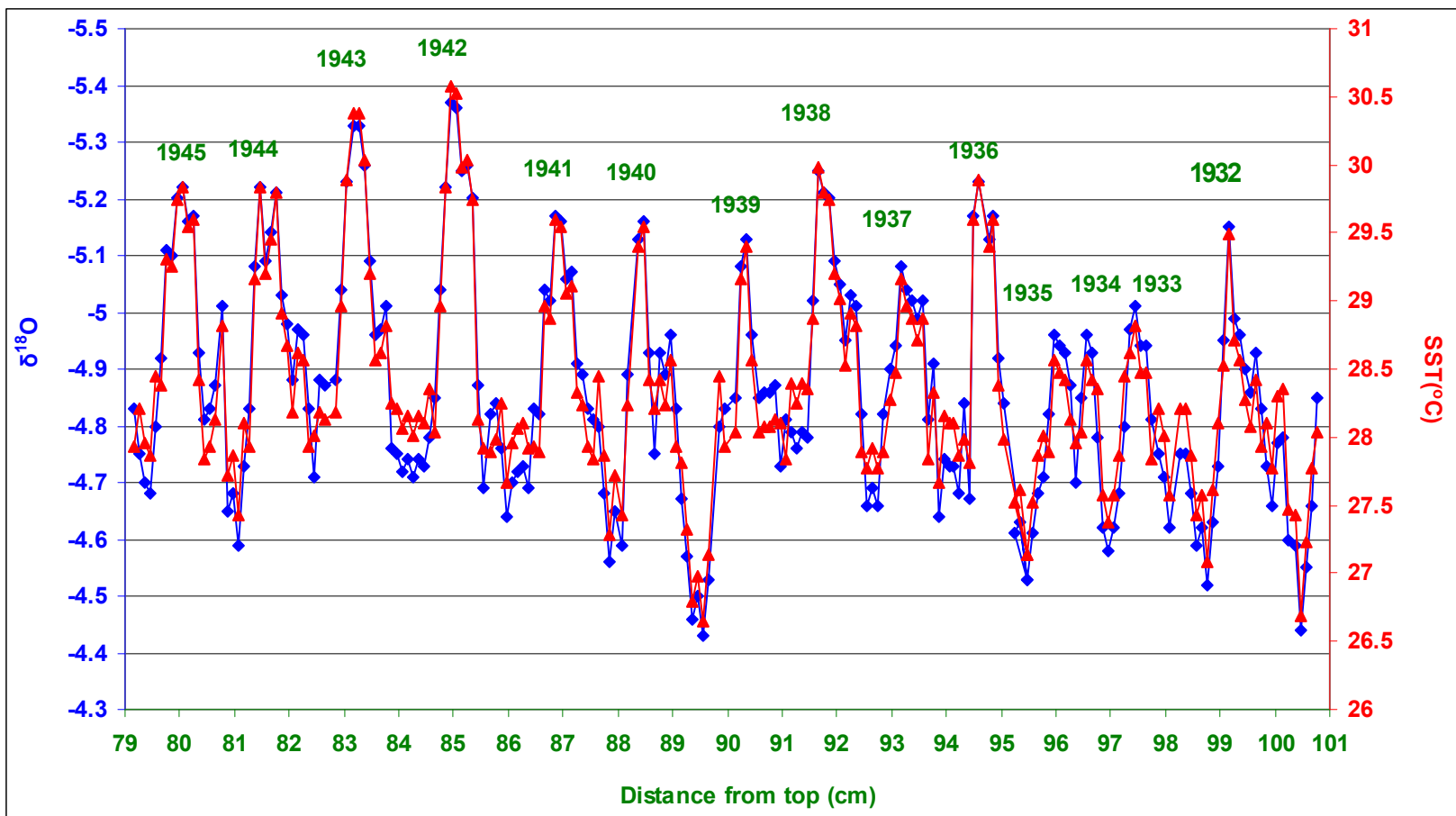


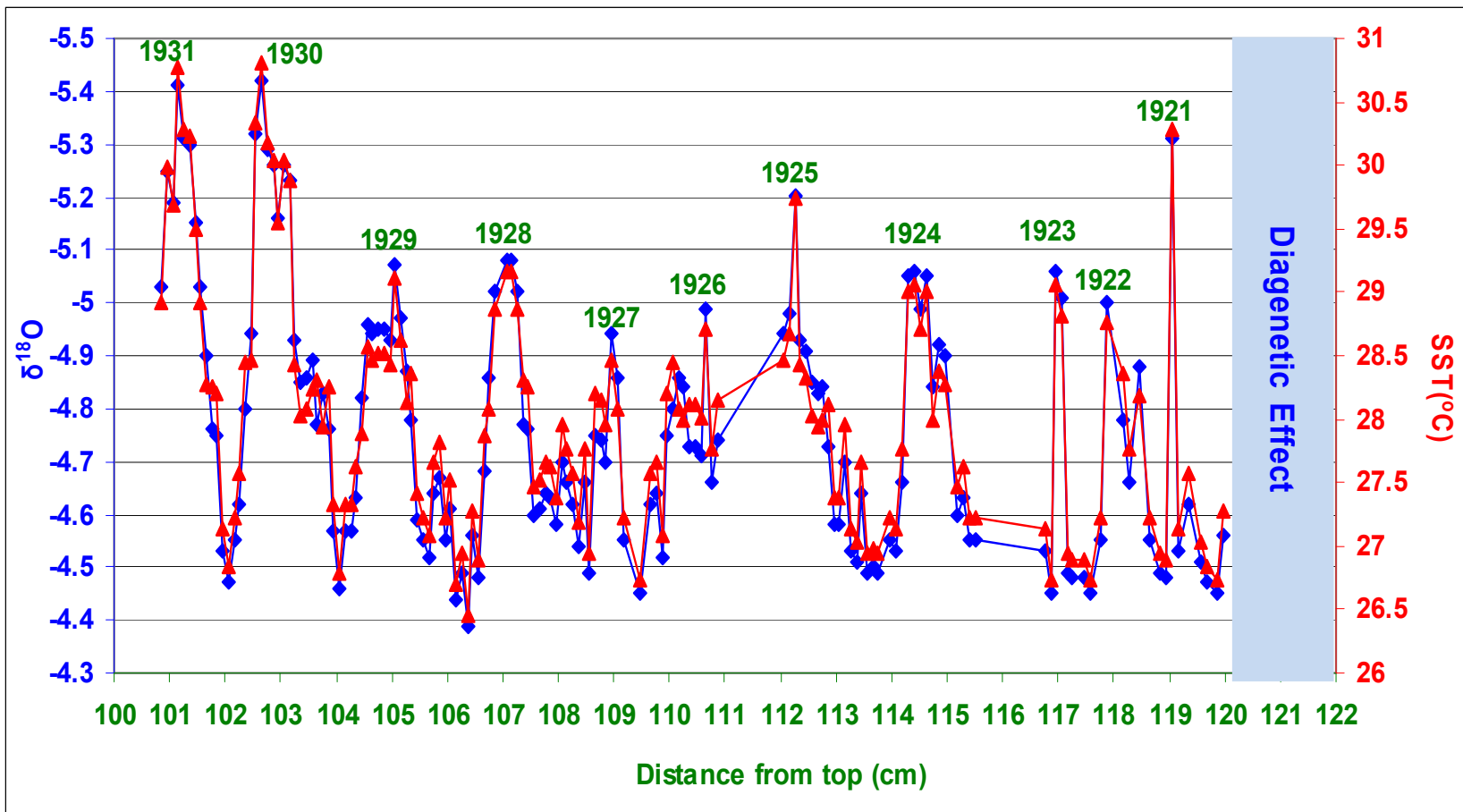


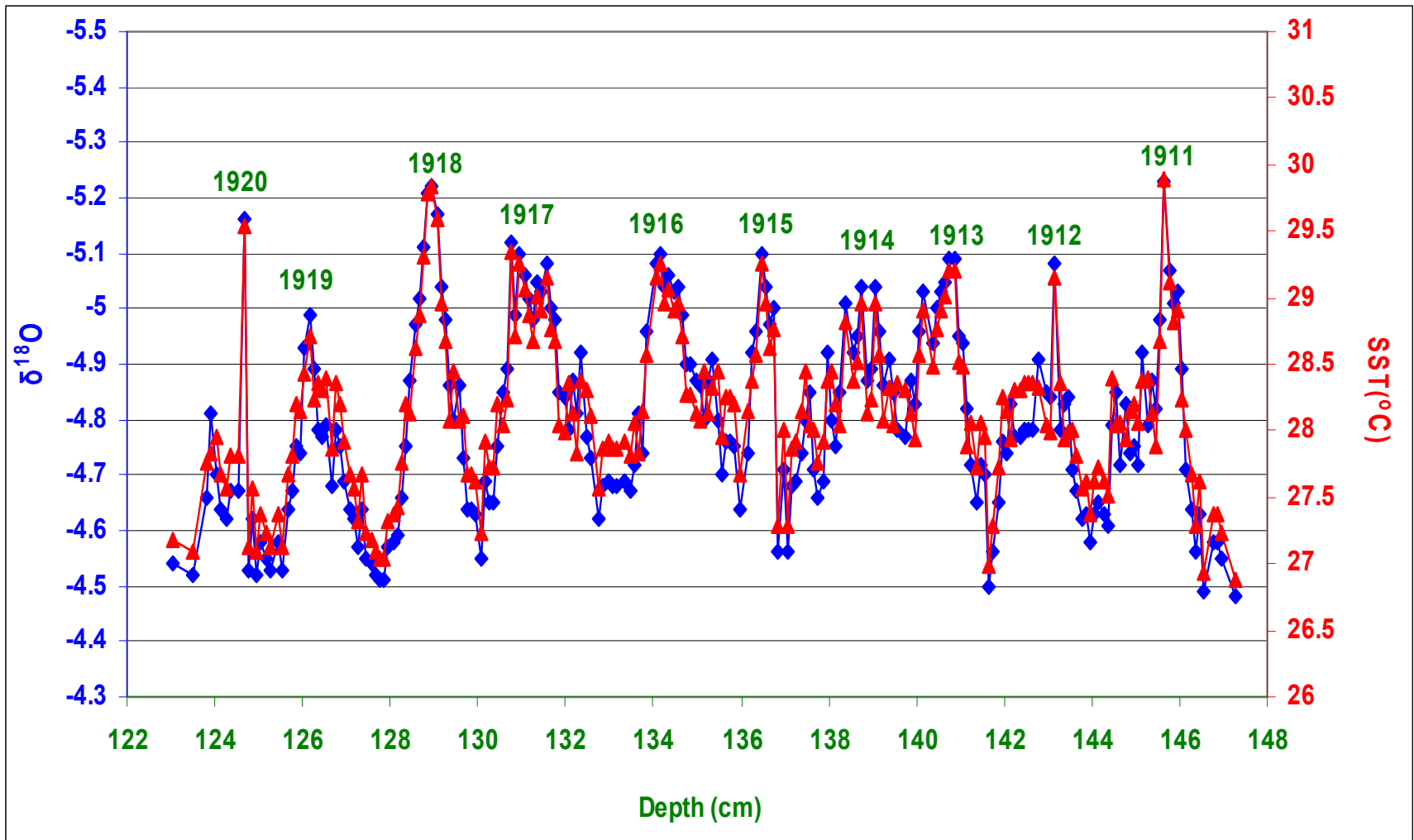


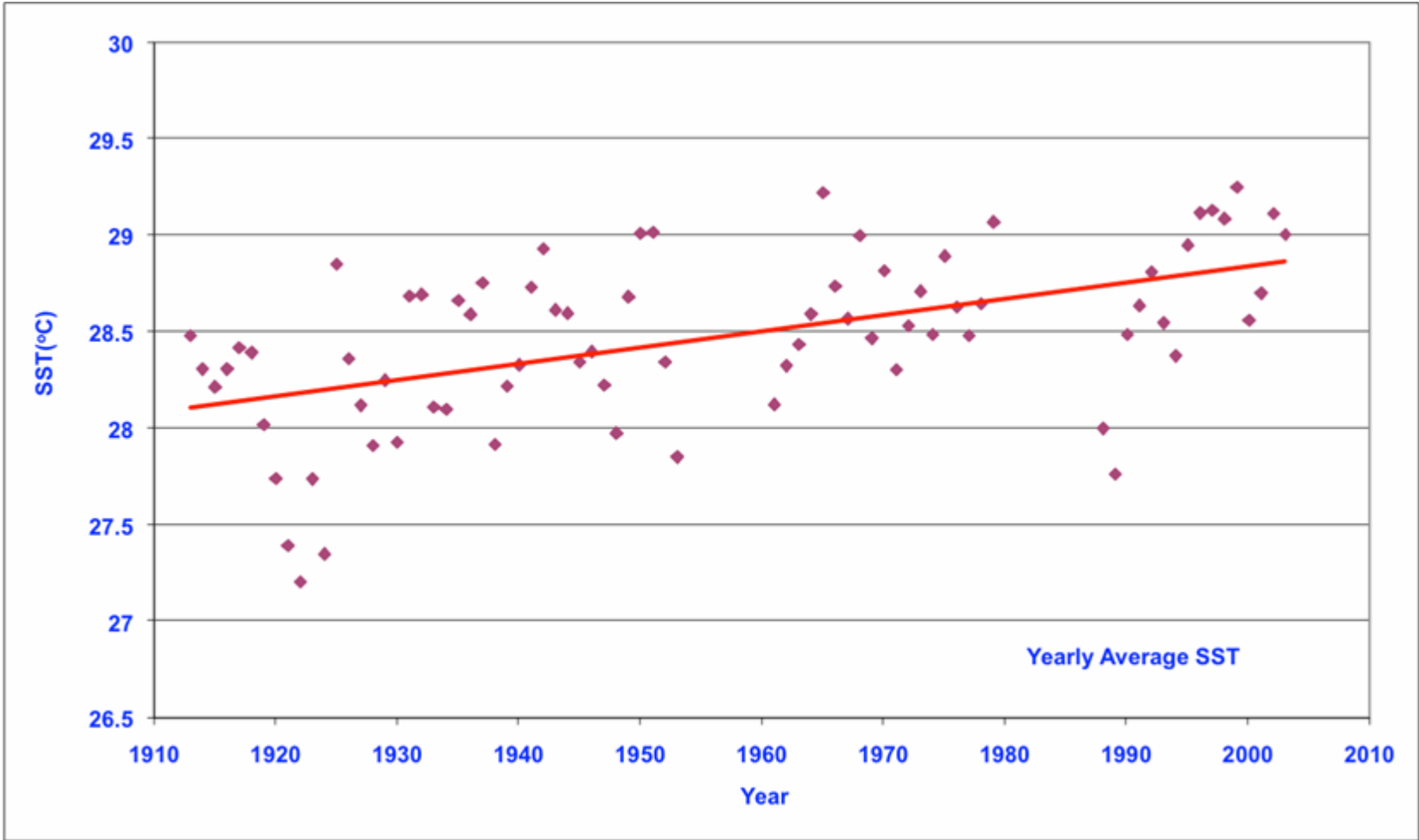


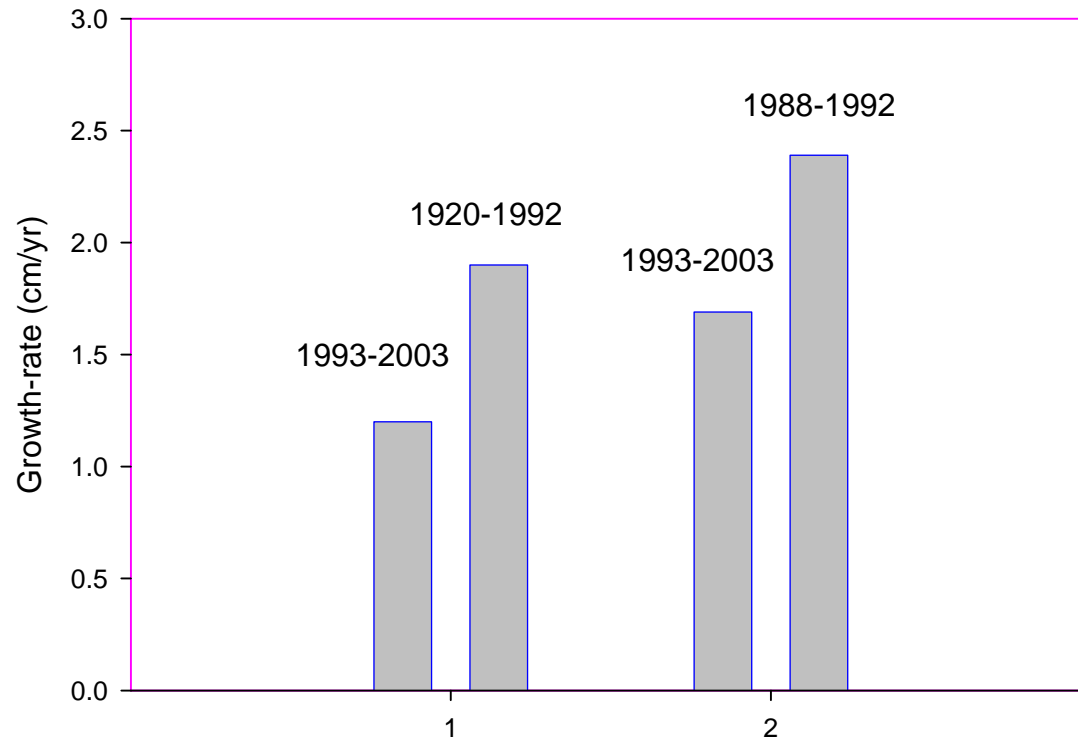












INFERENCES:

- * **The average SST around the Lakshadweep islands has increased by $\sim 0.8^{\circ}\text{C}$ from 1911 to 2003 AD. This increase is greater than the mean SST increase of $\sim 0.6^{\circ}\text{C}$ for the global surface temperature**
- * **This relatively higher increase in annual SST indicate decrease in monsoon-derived upwelling**
- * **Lower calcification rates, since 1993, in *Porites* corals of Lakshadweep region are consistent with the Great Barrier Reef records of decrease in calcification, indicating effects of ocean acidification and/or SST increase.**
- * **Decadal to interdecadal climate variability is seen in Lakshadweep corals.**