

**How well would modern-day oceanic property distributions be known with paleoceanographic-like observations?**

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Dataset S1

**Introduction**

Dataset S1 contains the synthetic observations used in all four of the experiments of this work. The observations are sampled at 492 core locations, where the “true” 3D distributions are available at <http://www.whoi.edu/website/ggebbie> . In Dataset S1 provided here as a CSV file, no noise has been added to the synthetic observations.

**Data Set S1.** The CSV file contains the following information at the 492 core sites: Longitude [deg E], Latitude [deg N], Depth [m], Potential Temperature [deg C], Practical Salinity [ ], Phosphate [umol/kg], Nitrate [umol/kg], Oxygen [O<sub>2</sub>, umol/kg], d18O of seawater [per mil VSMOW], d13C of DIC [per mil VPDB], d18O of calcite [per mil], d13C of calcite [per mil], Cd of seawater [nmol/kg].