Calibration Information for TatooshHydrolab2000to2010.

Measurements were made with a Hydrolab DS4a (6/2000-8/2008) and by a Hydrolab DS5x (8/2008-present). The sondes deployed at Tatoosh Island, Washington, USA (48.3931^{o} latitude, -124.7343^{o} longitude) in a 5000 l tidepool whose surface is at +80 cm above MLLW. When connected to the ocean, the tidepool conditions correspond to those of the adjacent ocean, as assessed by measurements taken on calm days when differences are most likely to arise (see data in Wootton et al. 2008).

Calibration of core parameters in the dataset varied depending on particular probe requirements.

Temperature and salinity/conductivity were calibrated at the factory prior to initial deployment and when the probes went in for repairs every few years, with no subsequent calibration in the field. Calibrations were done June 2000, October 2004, October 2005, October 2007, and July 2008 (new sonde deployment).

Dissolved oxygen was calibrated at the factory, prior to deployment each field season, and at each servicing/cleaning period (usually every 2 weeks) during each field season. Times of these calibrations can be discerned in the data file by finding the 12-24 hr breaks in the data series. Calibration was done using the 100% saturated air method. During 2003-2005 and 2007-mid 2008, the probe would not calibrate within the factory-determined performance bounds and/or failed. The logger continued to be deployed during these periods to allow collection of other data, but the DO data during these periods are unreliable. During the period of deployment of the DS4a, where a Clark cell selective membrane methodology was used, the probe would show evidence of drift during re-calibration (typically $\pm$ 10%). Following deployment of the DS5x, which has an automated self-cleaning brush and uses a luminescent dissolved oxygen (LDO) detector, evidence of drifting at calibration was nearly absent ($\pm$ 0.2%).

pH was calibrated at the factory prior to initial deployments and during factory servicing, and by us during regular servicing/cleaning periods during 2008-2010. Calibration used NBS standard buffers of pH 7.0 and 10.0 (when at 25^{o}C), and effects of buffer temperature variation based on charts provided with the buffers were accounted for in the calibrations. Times of pH calibration can be discerned by inspecting the YrsSvc column in the main data file and subtracting to obtain times when it would equal 0. To account for possible drifting of the pH probe between calibrations, we used a statistical model to calculate typical drift behavior, using non-linear regression of change in pH from initial deployment value vs. time since calibration (through 2007). This procedure yielded the relationship deltapH = (0.497124*elapsed time (yrs)/(1+0.74532*elapsed time), which was then subtracted from the observed value to attain a drift-corrected pH estimate. Beginning in 2009, we checked pH readings from the probes against spectrophotometric pH measurements obtained from concurrently sampled water,

and with probe measurements on a saline standard obtained from Andrew Dickson, Scripps Institute of Oceanography. Measurements were consistent among these checks, and are reported in Wootton and Pfister (2012, PLoS ONE).

Data in the file is filtered to removed observations with tide heights < 80 cm, and data of uncertain quality as described above for DO and pH. Data during low tide periods are available upon request from the authors (twootton@uchicago.edu, cpfister@uchicago.edu).

Relevant papers outlining the data set and methods in more detail and using it include the following:

2007. C. A. Pfister, J. T. Wootton, and C. J. Neufeld. The relative roles of coastal and oceanic processes in determining physical and chemical characteristics of an intensively sampled nearshore system. Limnology and Oceanography 52:1767-1775.

2008. J. T. Wootton, C. A. Pfister and J. D. Forester. Dynamical patterns and ecological impacts of ocean pH in a high-resolution, multi-year dataset. Proceedings of the National Academy of Science 105:18848-18853.

2011. C. A. Pfister, S. J. McCoy, J. T. Wootton, P. A. Martin, A. S. Colman, and D. Archer. Rapid environmental change revealed by isotopic analysis of the California mussel in the northeast Pacific. PLoS ONE 6(10): e25766. doi:10.1371/journal.pone.0025766.

In Press. J. T. Wootton and C. A. Pfister. Carbon System Measurements and Potential Climatic Drivers at a Site of Rapidly Declining Ocean pH. PLoS ONE.