**Pylake Physics**

Pylake is a python library to compute various physical parameters from raw measurements in lakes. Many functions are largely based on rLakeAnalyzer (Albers et al., 2018)

Here we give some background about the physics and equations used in functions.

**Computing specific conductivity from raw conductivity**

* From ionic composition (if available) compute according to Wüest et al. (2019)
* Assuming salinity consisting entirely of calcium carbonate (good approximation in many lakes) and compute according to Wüest et al. (2019)

**Computing salinity from specific conductivity**

* From ionic composition (if available) compute according to Wüest et al. (2019)
* Assuming salinity consisting entirely of calcium carbonate (good approximation in many lakes) and compute according to Wüest et al. (2019)

**Computing density from water temperature and salinity**

* According to Wüest et al. (2019), taking freshwater density from Chen & Millero (1986)
* According to Chen & Millero (1986), implemented in the python freshwater library by Daniel Robb

**Solubility of dissolved oxygen**

Oxygen solubility is computed according to Benson & Krause (1984) but ignoring the effect of salinity, which is negligible in freshwater.

The effect to atmospheric pressure (altitude) on oxygen saturation is computed assuming a standard atmospheric decrease of pressure with altitude and by including humidity.

**References**

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