Status report on uncertainties in in-situ measurements, or what should contribute to the error bar?

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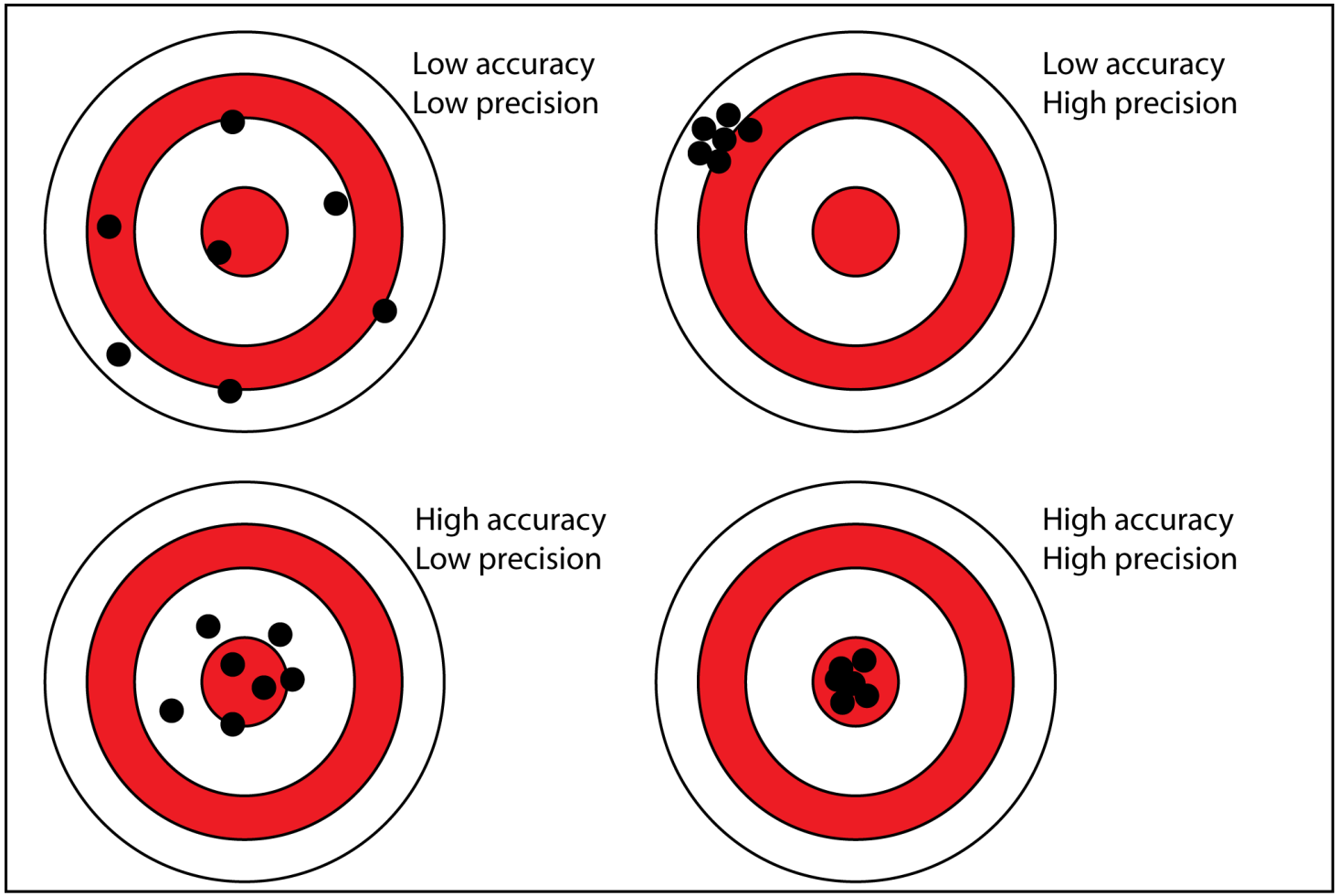

Critical to identify bias as they are not reduced by increased sampling (stderr of the mean)

Sources of uncertainty in measurements – instrumental uncertainty:

Instrument does not measure quantity of interest exactly, but an approximate one (e.g. all instruments).

Quantity of interest is not very well defined (e.g. PSD for non-spherical particles).

Blank – how well can we calibrate an instrument? E.g. Is the calibration instrument/water temperature dependent? Is calibration applicable when measuring in salt water? In multiple scattering regime? How good is the standard?

Sensor drift

Sources of uncertainty in measurements – methodological uncertainty:

Interference with underlying particles (sorting, breaking) within instrument and interaction with instrument cage/flowthrough system.

Shading (by structure/sensor). e.g. no shading correction to date includes Raman. All have assumptions and require RT modeling.

Volume sampled: how representative is the volume sampled of the water we want to characterize? How well can we capture the variability in the environment?

Sources of uncertainty in measurements – environmental uncertainty (for cal/val):

How representative is our measurement of a satellite pixel (or 5x5) due to:

Time difference.

Horizontal inhomogeneity?

Vertical inhomogeneity? Should it be weighed?

Difference between space-based viewing angle and in-situ viewing angle.

Crossing the interface – effects of waves.