



DeWiggling Report #1

After completing the first DeWiggling season, an analysis of the data was done to provide insight into some common issues. This analysis also yielded some helpful suggestions for the process of applying the DeWiggler results.

Compass deviation

Compasses comprise approximately half the error encountered with wind direction and current set & drift calculation. There is no ready way to determine how much the compass is contributing without testing it.

Statistics:

- First results of the Speed-Heading test showed that the median peak-to-peak deviation¹ was 6°, with a worst case of 13.6°, and a best case of 1.2°. Compass deviation contributes 100% into wind direction wiggle and current calculation.
- Compass misalignment ('lubber offset') averages 3° with a worst case of 7.7° and a best case of 0.3°. Misalignment has no effect on wind direction wiggle, but affects current calculation.

For current calculation, total compass error (deviation plus offset) produces an error in current calculation of roughly 0.1 knot for per degree of error. In a half knot current, this will throw the current direction calculation off by about 10° per degree of compass error.

Remediation:

- Performing the automatic compensation ("Re-spinning") of the compass and testing again (about half tried this) results in an average improvement of about 2°.
- For the two worst cases (peak-to-peak deviation in excess of 10°), moving the compass was recommended. Retesting showed an average improvement of 220% or 8°.
- There was one case where the compass was replaced with a more modern one. There was no effect on accuracy, indicating that the problem was the compass environment and not the hardware or testing method.

¹ Deviation is the amount the compass differs from correct reading after the average error (lubber offset) is removed. Peak-to-peak means the number of degrees between the most positive and the most negative deviations.

Conclusions:

1. Of all the DeWiggler tests, the speed & heading test is the easiest to do, taking about an hour, with no crew or sail handling required. It will address a major contributor to instrument error with very little investment in time.
2. If your compass tests out with more than 6° peak-to-peak deviation, the compass should be moved to a location with less magnetic interference.
3. If the lubber offset is more than about 1.5°, the compass mount should be adjusted to improve the current calculation.

Wind Direction Wiggle

DeWiggler statistics for wind direction are harder to compare due to the extra dimension of true wind speed. Because of this, tests rarely can be compared apples to apples. The increased effort required makes it harder to get retests done, so before and after comparisons are rare (at least in the first year of operation).

However, by picking two cases, this can be said: DeWiggler tends to reduce wind direction wiggle by about 50% in the first pass. One case is the J/35 "Time Machine". The owner, Robert Gordenker, was kind enough to give us a testimonial. See <http://www.ockam.com/dewiggler/index.html#Gordenker> for his take on DeWiggler.

Changes in DeWiggler

The first DeWiggler session occurred in June of '08. Since that time, there have been about 6 incremental improvements. From experience gained at Key West Race Week 2009, it is apparent that DeWiggler trials as a springtime chore are a far cry from doing them two days before a major event.

Next spring's DeWiggler will be updated to lessen its intrusion during crew preparation before and during a major race.