Ocean Sci. Discuss., 9, C625–C629, 2012
www.ocean-sci-discuss.net/9/C625/2012/

Ocean Science
Discussions

Interactive comment on "Validation of FOAM near-surface ocean current forecasts using Lagrangian drifting buoys" *by* E. W. Blockley et al.

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Received and published: 28 June 2012

The authors would like to thank both of the reviewers for taking the time to read our paper and for providing such positive comments.

The main issue raised in review 1 (Rick Lumpkin) was that it was not clear why the GTS data was being used rather than the quality-controlled GDP data which includes velocity.

Our motivation for using the GTS data is that we aim to implement this technique operationally, in near-real-time, before the quality-controlled GDP data becomes available. This really should have been explained in the original manuscript and so a couple of sentences have been added in Section 2 to clarify the situation.

In response to Rick's comment regarding the possible aliasing of higher-frequency motions into the inferred pseudo-Eulerian velocity data, an additional paragraph has been added to the Summary to highlight these issues (including a reference to the re-evaluated drifter-drogue statuses as discussed by Lumpkin et al. 2012).

All the further minor/specific comments raised by Rick have been addressed and suitable corrections made.

Here is a complete list of changes:

Section 2.1

changed

'[the drogue] exerts a drag approximately 40 times the drag of the tether and the surface buoy. This 40:1 drag ratio'

to

'[the drogue] has a cross-sectional area approximately 40 times that of the tether and the surface buoy. This 40:1 drag area ratio'

changed

'The SVP drifters are tracked by the Argos Data Collection and Location System...'

to

'Most SVP drifters are tracked by the Argos Data Collection and Location System...'

changed

'Drifter data can be obtained through the Global Telecommunication System (GTS) or from the Global Drifter Program (GDP) via download from http://www.aoml.noaa.gov/phod/trinanes/xbt.html.'

to

'Drifter data can be obtained in near-real-time through the Global Telecommunication System (GTS) or as quality-controlled delayed-mode data from the Global Drifter Program (GDP) available via download from http://www.aoml.noaa.gov/phod/dac/dacdata.php. These delayed-mode GDP data are quality-controlled to remove undrogued and shipboard drifters and include 6-hourly velocity estimates as well as error bars for their positions. The GTS data meanwhile do not include velocity estimates (only positional information and surface measurements of SST) and are not subject to the velocity-specific quality control procedures that are applied to the GDP data.

In this study, despite the obvious advantages to using the quality-controlled GDP dataset, we shall infer near-surface ocean currents from the near-real-time GTS drifter data. The reason for using the GTS data is that we wish to implement this ocean current verification into the FOAM system of Storkey et al. 2010 in near-real-time.'

Section 2.2

changed

'The main purpose of the moored buoy array is to monitor El Nino Southern Oscillation (ENSO), the Pacific and Indian Ocean monsoons as well as hurricane activity in the Atlantic.'

to

'The main purpose of the moored buoy array is to monitor interannual climate fluctuations in the tropics (e.g. El Nino Southern Oscillation (ENSO), Madden-Julian Oscillation (MJO)), the Pacific and Indian Ocean monsoons as well as hurricane (typhoon) activity in the Atlantic (Pacifc) Ocean.'

Section 3

After

'However they are not completely independent because the drifter positions contribute towards the calculation of the MDT (along with geostrophic and Ekman currents) used in the SLA assimilation.'

added

'This dependence on the MDT would only be expected to have an effect on the large-scale, long-term circulation of the model meaning that the drifter observations can be effectively considered independent for current variations about the long-term mean.'

Section 5.1

changed

'The most likely reason for this is that the 6-hourly wind fields used to force the model surface boundary and the spatial resolution of the model are too coarse to capture high-frequency features such as inertial currents.'

to

'The most likely reason for this is that the horizontal resolution of the eddy-permitting model coupled with the 6-hourly wind fields used to force the surface boundary are too coarse to capture submesoscale, or even relatively fine-scale mesoscale, features.'

Section 7

An additional paragraph has been added to the Summary to further discuss some of the issues that arise from the way pseudo-Eulerian velocities are inferred from GTS drifters. This also mentions that future assessments will be performed using the re-evaluated drifter-drogue status as discussed by Lumpkin et al. 2012.

References

Added the following reference:

Lumpkin, R.; Grodsky, S. A.; Centurioni, L.; Rio, M-H.; Carton, J. A.; Lee, D. "Remov-

ing spurious low-frequency variability in drifter velocities." Submitted to Geophysical Research Letters (GRL) April 2012

Interactive comment on Ocean Sci. Discuss., 9, 1705, 2012.