Land-Sea Masks for the APS2 ACCESS-C systems (2016/11/18, Gary Dietachmayer)

1. The land-sea mask (hereafter "LSM") is an array of grid-points indicating to the model which columns of points are over land, and which are over water.
2. In an extended period of trialling, R&D has used a consistent set of LSMs with relatively little manual editing – we refer to these here as "uLSM" (unedited LSM).
3. The significant improvement of APS2 ACCESS-C over APS1 ACCESS-C, particularly for rainfall, has been established *using these uLSMs*.
4. Un-edited (not tweaked/tuned) LSMs are constructed through automated processing of external topography (and other) data-sets. At very high resolutions, such as those in ACCESS-C, this automated generation can lead to *grid-scale* anomalies around the coast.
5. Being grid-scale, these coastal anomalies usually have little impact on the performance of ACCESS-C as measured by our standard verification methods – the "error forcing" from the anomalies occurs at a length-scale the model can't handle, propagate, etc.
6. However, there are cases in which such grid-scale anomalies impact downstream systems. For example, in OCF, which compares model forecast values to those from surface observations, spurious differences can be created near the coast where a (land) observation site is located "in" a model cell that has been categorised as sea.
7. Work is ongoing in R&D to improve the accuracy of the APS2 ACCESS-C LSMs, and considerable progress has been made, for example on tools for improved semi-automated generation. However, we do not have "final", fully tweaked/tuned LSMs at this point.

Recommendations:

1. Noting again that the improved performance of APS2 ACCESS-C over its APS1 counterpart was demonstrated with the current uLSMs, the current work on operationalizing APS2 ACCESS-C, and the impending Christmas code-freeze: that operationalization of APS2 ACCESS-C continue using the current uLSMs.
2. That R&D (largely ESM) continue to work towards "final" LSMs as a matter of urgency, and that downstream system owners (eg., for OCF) be involved in a review of these LSMs before their acceptance.
3. Noting that "swapping in" final LSMs into operations is relatively straightforward at a technical level (no code recompilation, no change in data-volumes or grids, limited impact on model-performance at resolved length-scales): that R&D, BNOC, and ISS plan for the introduction of finalised LSMs into the operational APS2 ACCESS-C systems in Q1 of 2017.