Argo BUFR enhancements

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BUFR migration

• WMO policy is to move to TDCF (Table Driven Code Forms) for exchange of data on the GTS and cease using the legacy TAC (Traditional Alphanumeric Codes)

• However, the time-table for migration (with marine data starting 2005) has slipped and migration/TAC cessation is still not complete as many National Met Services are not yet ready for full transition

• However, Argo is in pretty good shape in terms of distributing its core T&S data in BUFR (TM 3-15-003) alongside the legacy TESAC format
Stats for 2015 (from MEDS)

Jan 15 to Jan 16

- 75% of messages also in BUFR (has increased to ~90%)
- 88% of BUFR within 24 hrs (cf 91% for TESAC)
Argo BUFR enhancements that were approved in 2015

• Use sequence 3-15-003 for the primary core-Argo CTD profile, which can be followed by additional sequences that define any additional data

  • 3-06-037 for dissolved oxygen profiles

  • Additional sequences 3-06-017 for supplementary temperature and 3-06-018 for temperature & salinity profiles

  • Modified code table 0-08-034 which describes the supplementary profile types maps to the Argo NetCDF (reference table 16)
• At the present the following bio-geochemical variables are already defined in BUFR

0-013-083 for dissolved oxygen \((\text{kg m}^{-3})\)
0-022-188 for dissolved oxygen \((\mu\text{mol kg}^{-1})\)
0-041-001 for pCO2 \((\text{Pa})\)
0-041-002 for chlorophyll fluorescence \((\text{kg l}^{-1} = 10^9 \text{mg m}^{-3})\)
0-013-084 for turbidity \((\text{lm})\)
0-041-003 for dissolved nitrates \((\mu\text{mol kg}^{-1})\)
0-013-080 for pH
Additional bgc descriptors to be defined

- CDOM (in ppb)
  - Data width of 10 bits would allow to represent values in range from 0 to 1023 ppb (is this high enough to cover all applications?)

- pH scale (seawater, free or total)
• Suggested new sequences for profiles of chlorophyll-A, dissolved nitrates, CDOM, pH (and backscattering with wavelength/frequency))

• These follow the structure of the already agreed sequence (3-06-937) for dissolved oxygen (which includes the quality flags)

• Define additional entries in code table 0-08-080 to specify qualifiers for quality are for chlorophyll-A, dissolved nitrates, CDOM or pH (omissions in document to be rectified)

• Sequence for pH includes the extra descriptor for pH scale
• Submit proposals to WMO IPET-DRMM (Inter Programme Expert Team on Data Representation Maintenance and Monitoring) meeting (30 May to 6 Jun)]

• IPET-DRMM accept the proposals for validation (i.e. at least 2 centres encode and decode each others BUFR messages), during which changes can be made as necessary

• If successfully validated could be given pre-operational status autumn 2016 and can then be exchanged on GTS

• Formal operational status would be given by the next session of WMO CBS (Commission for Basic Systems) – 4Q2016?