Distributed Oceanographic Match-up Service (DOMS)
Translation Specification: ICOADS In Situ Data

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Introduction

To make the DOMS matchup output meaningful and easy to use the collaborating partners must standardize their data within the DOMS prototype. This document defines the translation of ICOADS data from the ICOADS value-added database (IVAD) into a ICOADS-DOMS database and finally into Apache Solr (the in-situ indexing approach chosen for DOMS).

ID:

Unique Identification for each ICOADS record.
CF name = id

Date and time:

Convert separate fields of YR, MO, DY, and decimal HR in UTC to ISO 8601.
ISO 8601 format: YYYY-MM-DDT hh:mm:ssZ
The record is skipped if HR or DY are missing, or the value of DY is invalid, e.g. 30 February.
CF name = time

Latitude:

Copy LAT in decimal degrees with +North and - South, precision .01 degrees
CF name = latitude

Longitude:

Decimal degrees in -180 West to +180 East, precision .01 degrees
Convert LON 0.00 to 359.99 to -179.99 to 180.00 East
Note there will be no 180.00 West.
CF name = longitude

Translate ICOADS Platform Type (PT) in DOMS consistent Platform and Device Indices.
Platform:

DOMS Index Code	DOMS Description	ICOADS PT mapping
1	ship	1-5, 9
2	moored surface buoy	6
3	drifting surface float	7
4	drifting subsurface profiling float	18
5	autonomous underwater vehicle	21, 20
6	offshore structure	15
7	coastal structure	13,14,16
8	towed unmanned submersible	19
missing	unknown, and devices	0, 10, 11, 12, 17

Device:

DOMS Index Code	DOMS Description	ICOADS Device (from PT) mapping
1	bathythermographs	11,12
2	discrete water samplers	10
3	CTD	17
missing	missing	

Set Mission to the DOMS agreed upon code.

Mission:

    Set = 2, ICOADS

Sea_water_temperature:
1. If OTV is available in *Nocn* and OTZ <= 10m or missing
        a. sea_water_temperature = OTV, precision = .001 degrees C
2. If OTV is not available in *Nocn, or OTZ > 10m*, but SST is available in C0
        a. sea_water_temperature = SST, precision = .1 degrees C
3. If OTV and SST are not available
        a. sea_water_temperature = missing

CF name = sea_water_temperature

Sea_water_temperature_depth:
In matching ordered sequence with sea_water_temperature above.
1. sea_water_temperature_depth = OTZ, depth positive downward, precision .01m
      a. If OTZ is missing, sea_water_temperature_depth = missing
2. sea_water_temperature_depth
      a. If DOS is available in Meta-vos and it is <= 10m,
          sea_water_temperature_depth = DOS, precision 1 meter.
      b. If DOS is missing, sea_water_temperature_depth = missing
3. sea_water_temperature_depth = missing
CF name = sea_water_temperature_depth

Sea_water_temperature_quality:
If sea_water_temperature = SST from C0 then:
      Evaluate ICOADS quality and trimming flags according to subroutine trim_stat.
      sea_water_temperature_quality = 0, enhanced statistic quality level - good data
      sea_water_temperature_quality = 1, not enhanced statistic quality level - bad
      data
If sea_water_temperature = OTV from Nocn then:
      Sea_water_temperature_quality = missing
CF name = sea_water_temperature_quality

Sea_water_salinity:
1. If OSV is available in *Nocn,* and OSZ <= 10m or missing
      a. sea_water_salinity = OSV, precision = .001 PSU
2. If OSV is not available in *Nocn, or OSZ > 10m*
      a. sea_water_salinty = missing
CF name = sea_water_salinity
Note: These data are from the WOD2013 and GOSUD. PSU is the assumed unit of measure.

Sea_water_salinity_depth:
In matching ordered sequence with sea_water_salinity above.
1. sea_water_salinity_depth = OSZ, depth positive downward, precision .01m
      a. If OSZ = missing, sea_water_salintiy_depth = missing
2. sea_water_salinity_depth = missing
CF name = sea_water_salinity_depth

Sea_water_salinty_quality:
sea_water_salinity_quality = missing
CF name = sea_water_salinty_quality

Wind_speed:

Copy wind_speed = W, precision = .1 m/s
CF Name = wind_speed

Eastward_wind and Northward_wind:
Use D and W from IMMA C0 segment to derive
- eastward_wind, positive east, precision = .1 m/s
- northward_wind, positive north, precision = .1 m/s

Note: D = wind_from_direction, validate conversion of reference frame
If D or W are missing eastward_wind and northward_wind = missing
CF names = eastward_wind and northward_wind

Wind_depth:
If the IMMA segment Meta-vos exists and HOA is non-missing, wind_depth = - HOA,
precision = 1 m
If Meta-vos is missing or HOA is missing, wind_depth = missing
CF Name = wind_depth

Wind_quality:
Evaluate ICOADS quality and trimming flags according to subroutine trim_stat.
        wind_quality = 0, enhanced statistic quality level - good data
        wind_quality = 1, not enhanced statistic quality level - bad data
CF name = wind_quality

Meta:
ICOADS specific metadata string

# Char.	ICOADS Name	Description
6	UID[1]	ICOADS unique record number
3	RN1-3[1]	Release number primary, secondary, tertiary sequence, e.g. Release 3.0.0
3	DCK[2]	Source Deck Number
3	SID[2]	Source Identification
2	PT[2]	Platform Type
2	SI[3]	SST measurement method, only if used in sea_water_temperature is obtained from C0 as noted above.
1	WI[3]	Wind speed indicator, only if wind_speed is obtained from C0 as noted above.

[1] Table C98, *Uida* attachment in the IMMA1 documentation: R3.0-imma1_short.pdf
[2] Table C1, *Icoads* attachment in the IMMA1 documentation: R3.0-imma1_short.pdf
[3] Table C0, *Core* record segment in the IMMA1 documentation: R3.0-imma1_short.pdf

1	DI[3]	Wind direction indicator, only if wind_speed is obtained from C0 as noted above.
54	*Meta-vos*[4]	21 elements of the Ship metadata attachment MDS through SMV
75	Total Char.	

In the DOMS Solr index query responses, each non-missing meta-string field/element (29 element for ICOADS) is represented in a JSON object. Only the non-missing field values are returned.

CF name = meta

Provenance Access

With regards to DOMS we define provenance access as the ability for the user to retrieve the original ICOADS data that has been included in a data matchup service. We leverage the fact that every ICOADS record has an unique identification value (UID). The UID is used for indexing the records in SOLR as the ID, and is available as the first six characters of the <meta> string. By using the ICOADS web service API with specification of the UID the full original ICOADS data record, in IMMA1 format, can be retrieved by any user. The methods for using the API and understanding the IMMA1 format are available at:
- ICOADS Value Added Database (IVAD) Web Service API
- ICOADS Release 3.0 IMMA1 Short Description

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[4] Table C7, *Meta-vos* attachment in the IMMA1 documentation: R3.0-imma1_short.pdf