

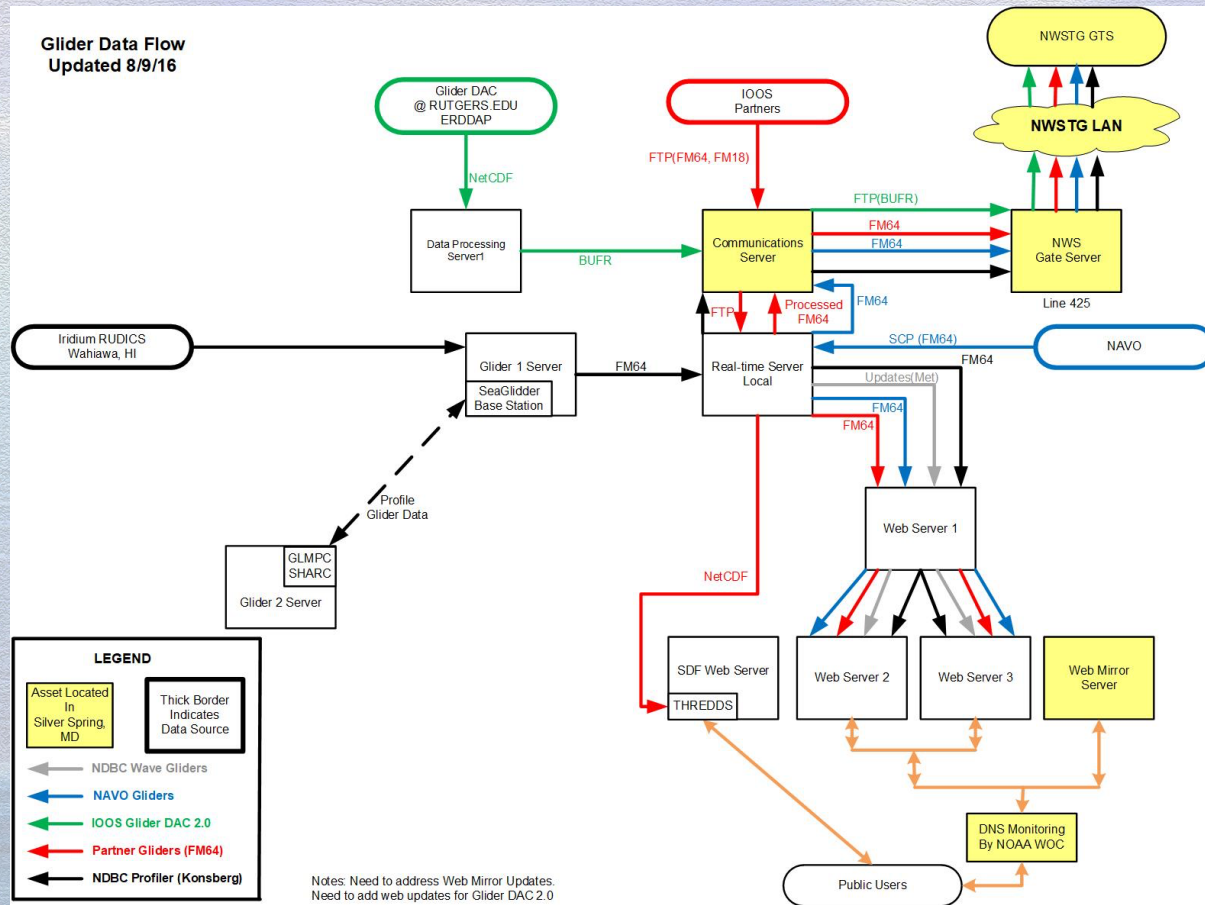


National Data Buoy Center Distribution of U.S. Glider Data

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NDBC Glider Data Flow



How does NDBC get glider data?

- U.S. glider operators submit data to the U.S. IOOS GliderDAC
 - NetCDF format, ERDDAP server
- NDBC pulls NetCDF files from GliderDAC ERDDAP server once per day
 - Request a list of changed datasets (example URL below)

<https://gliders.ioos.us/erddap/tabledap/allDatasets.json?datasetID&maxTime%3E=%222019-05-07T00:00:00Z%22>

Data Request from GliderDAC ERDDAP

- Result of request is a JSON file containing datasets to pull

```
{
  "table": {
    "columnNames": ["datasetID"],
    "columnTypes": ["String"],
    "columnUnits": [null],
    "rows": [
      ["bios_minnie-20190308T1859"],
      ["silbo-20180525T1016"],
      ["sp006-20190204T0038"],
      ["sp026-20190203T2219"],
      ["sp040-20190328T1804"],
      ["sp041-20190425T1708"],
      ["sp052-20190326T1708"],
      ["sp054-20181207T1726"],
      ["sp055-20190228T1734"],
      ["sp058-20190425T1707"],
      ["sp062-20190201T1350"],
      ["sp066-20190301T1640"]
    ]
  }
}
```


Sample Data Pull from GliderDAC ERDDAP

- Request files via URL, returns NetCDF files

https://gliders.ioos.us/erddap/tabledap/sp006-20190204T0038.nc?trajectory,wmo_id,time,latitude,latitude_qc,longitude,longitude_qc,time_qc,depth,depth_qc,pressure,pressure_qc,conductivity,conductivity_qc,density,density_qc,precise_lat,precise_lon,precise_time,profile_id,precise_lat_qc,precise_lon_qc,precise_time_qc,salinity,salinity_qc,temperature,temperature_qc,time_uv,time_uv_qc,lat_uv,lat_uv_qc,lon_uv,lon_uv_qc,u,u_qc,v,v_qc,platform_meta,instrument_ctd&profile_id>422

- URL request returns WMO ID, time, position, depth, pressure, conductivity, density, salinity, temperature, and QC parameters

Data Formatting for GTS Release

- NDBC selects specific fields from the NetCDF files
 - Water temperature, pressure, and salinity are primary parameters included in BUFR message
- Create BUFR message for each glider profile
 - Profiles are determined before NDBC harvests data from GliderDAC
- Use the BUFR drifting buoy template (TM315009)
- WMO header for distribution
 - IOSX05 KWNB

Sample BUFR Message

1 WMO MARINE OBSERVING PLATFORM EX 0.48019320000000E+007 NUMERIC
2 OBSERVING PLATFORM MANUFACTURER' 0.10200000000000E+004 CCITTIA5
3 OBSERVING PLATFORM MANUFACTURER' 0.20320000000000E+004 CCITTIA5
4 BUOY TYPE MISSING CODE TABLE 2036
5 DATA COLLECTION AND/OR LOCATION 0.20000000000000E+001 CODE TABLE 2148
6 TYPE OF DATA BUOY MISSING CODE TABLE 2149
7 FLOAT CYCLE NUMBER 0.48000000000000E+003 NUMERIC
8 DIRECTION OF PROFILE 0.10000000000000E+001 CODE TABLE 22056
9 INSTRUMENT TYPE FOR WATER TEMPER 0.83000000000000E+003 CODE TABLE 22067
10 YEAR 0.20190000000000E+004 A
11 MONTH 0.50000000000000E+001 MON
12 DAY 0.70000000000000E+001 D
13 HOUR 0.50000000000000E+001 H
14 MINUTE 0.56000000000000E+002 MIN
15 LATITUDE (HIGH ACCURACY) 0.33749420000000E+002 DEG
16 LONGITUDE (HIGH ACCURACY) -0.75042720000000E+002 DEG
17 QUALIFIER FOR GTSPQ QUALITY FLAG 0.20000000000000E+002 CODE TABLE 8080
18 GLOBAL GTSPQ QUALITY FLAG 0.80000000000000E+001 CODE TABLE 33050
19 EXTENDED DELAYED DESCRIPTOR REPL 0.22300000000000E+003 NUMERIC
20 WATER PRESSURE 0.10031000000000E+008 PA
21 QUALIFIER FOR GTSPQ QUALITY FLAG 0.10000000000000E+002 CODE TABLE 8080
22 GLOBAL GTSPQ QUALITY FLAG 0.00000000000000E+000 CODE TABLE 33050
23 SEA/WATER TEMPERATURE 0.27875500000000E+003 K
24 QUALIFIER FOR GTSPQ QUALITY FLAG 0.11000000000000E+002 CODE TABLE 8080
25 GLOBAL GTSPQ QUALITY FLAG 0.00000000000000E+000 CODE TABLE 33050
26 SALINITY 0.35037000000000E+002 0/00

Sea-Bird 41CP

Advantages of Current Distribution Method

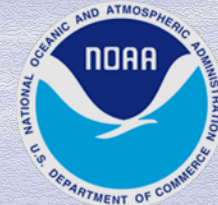
- Utilizing existing pathways to distribute glider data to the GTS
 - NDBC has years of experience putting data onto the GTS
- Able to send all data out at once
 - Multiple profiles each with individual time stamps
- Minimize work done by NDBC IT systems

Disadvantages of Current Distribution Method

- Using a BUFR template not specifically designed for glider data
- Limited measurements included in the GTS message
 - Temperature and salinity only
- Glider data going out only once per day
 - Cumulative past 24 hours going out at once instead of near real-time

Future Work

- Increase frequency of pull from GliderDAC to once per hour
 - Coordinated with GliderDAC and NOAA/NCEP/EMC to be ready for changes that National Weather Service is implementing for ocean data assimilation
- Work with glider community on BUFR template for glider data
 - Implement glider template once developed and approved



Thank you!

Questions?

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