Argo trajectories

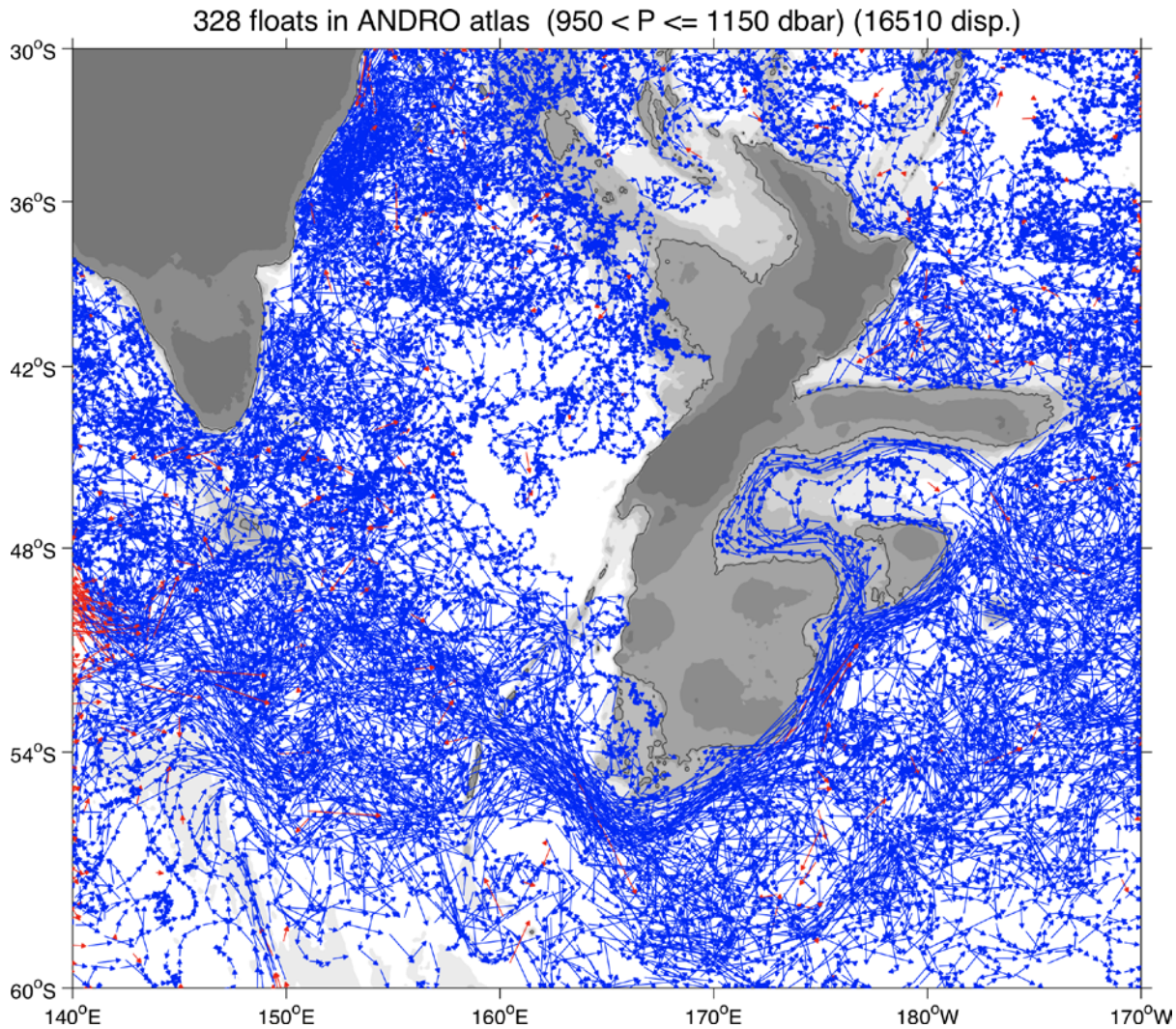
Michel Ollitrault & Jean-Philippe Rannou

Actual content of ANDRO

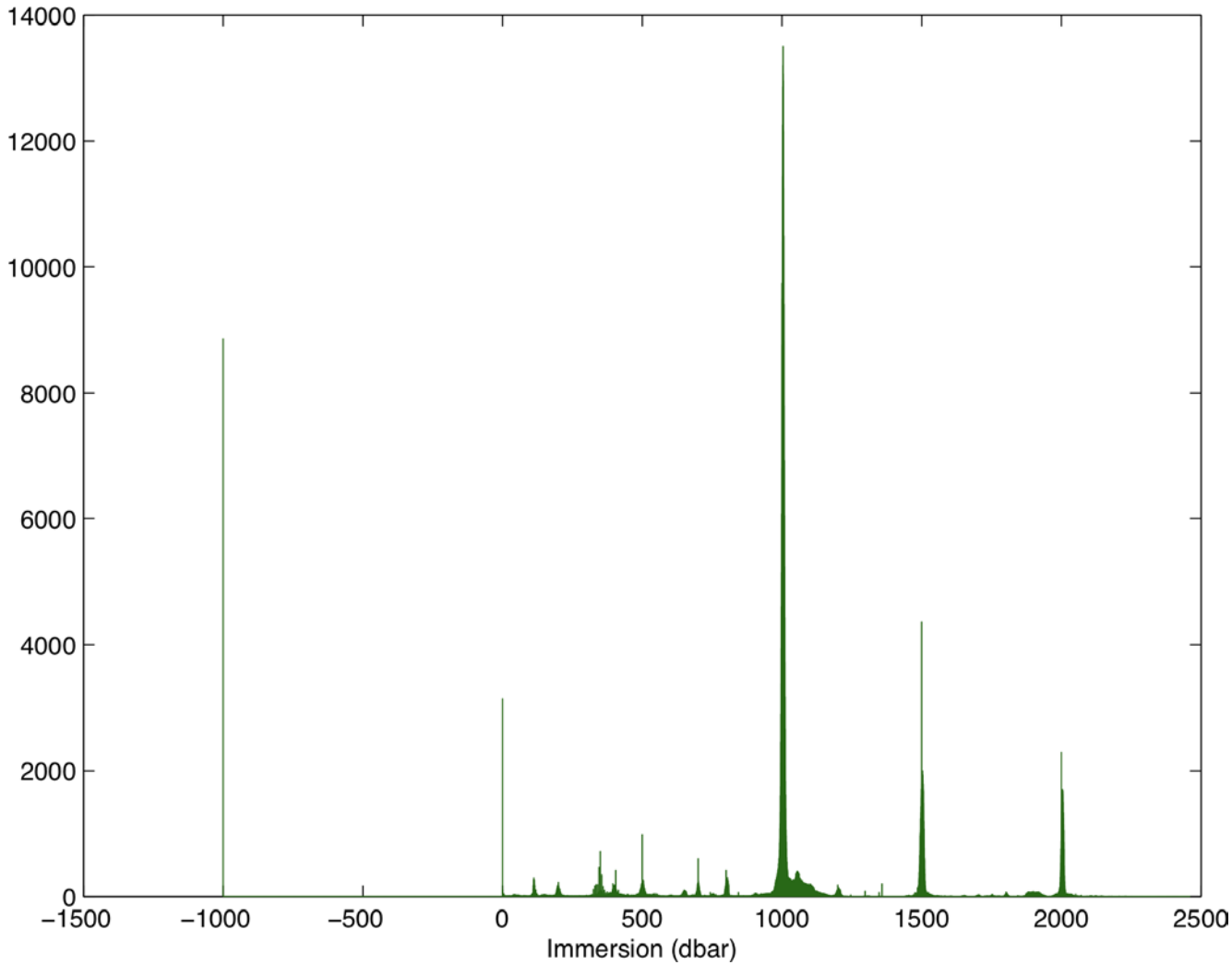
- All float displacements from the beginning of Argo to January 1 2010, fully checked.
- A total of 6212 floats, and 606119 displacements in ANDRO generated from the DEP files (6243 floats and 626036 cycles).
- 98% of the cycles have a carefully checked parking pressure. Grounded cycles are excluded from ANDRO

http://wwz.ifremer.fr/lpo/Produits/ANDRO/

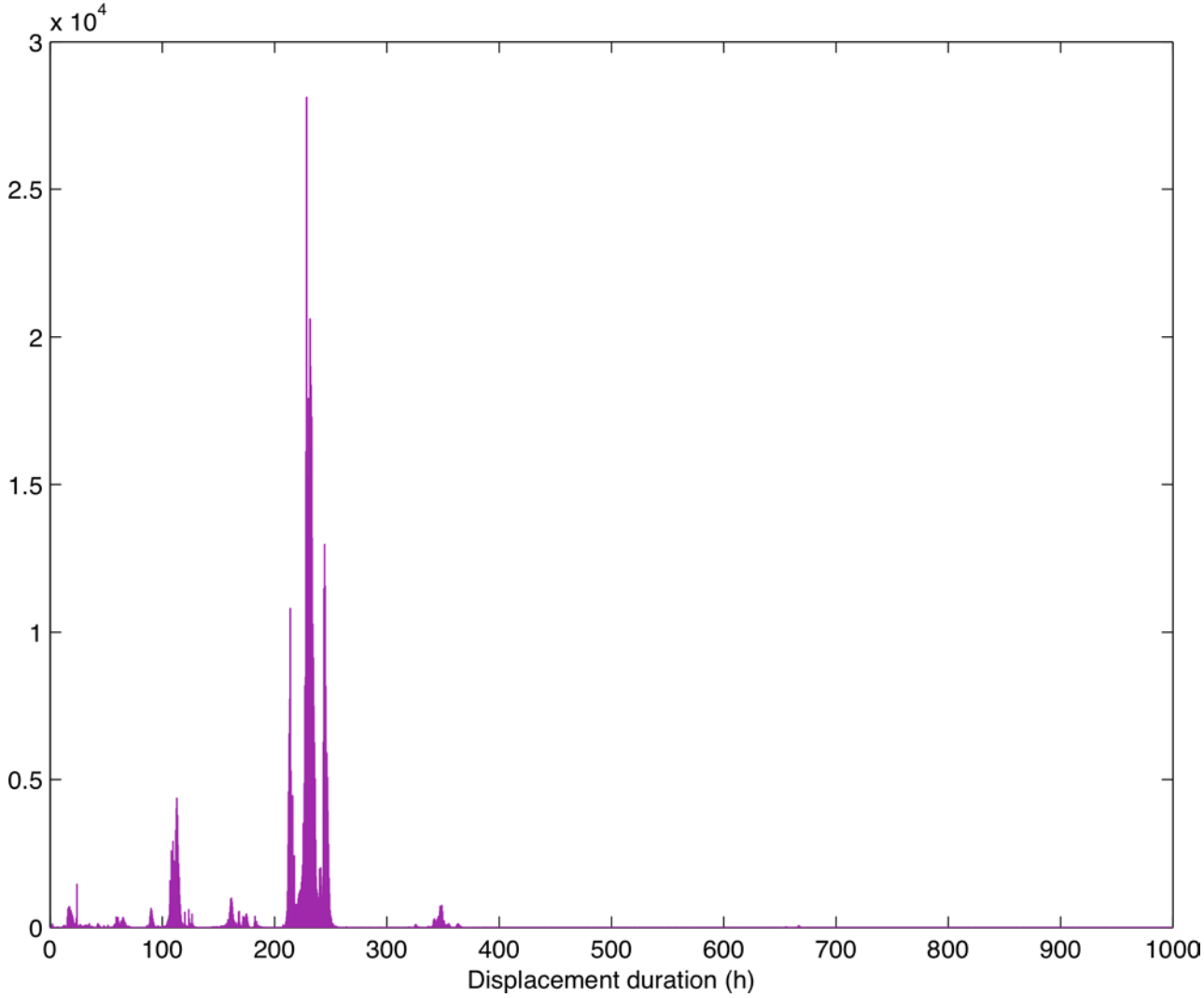
ANDRO Argo displacements near New Zealand



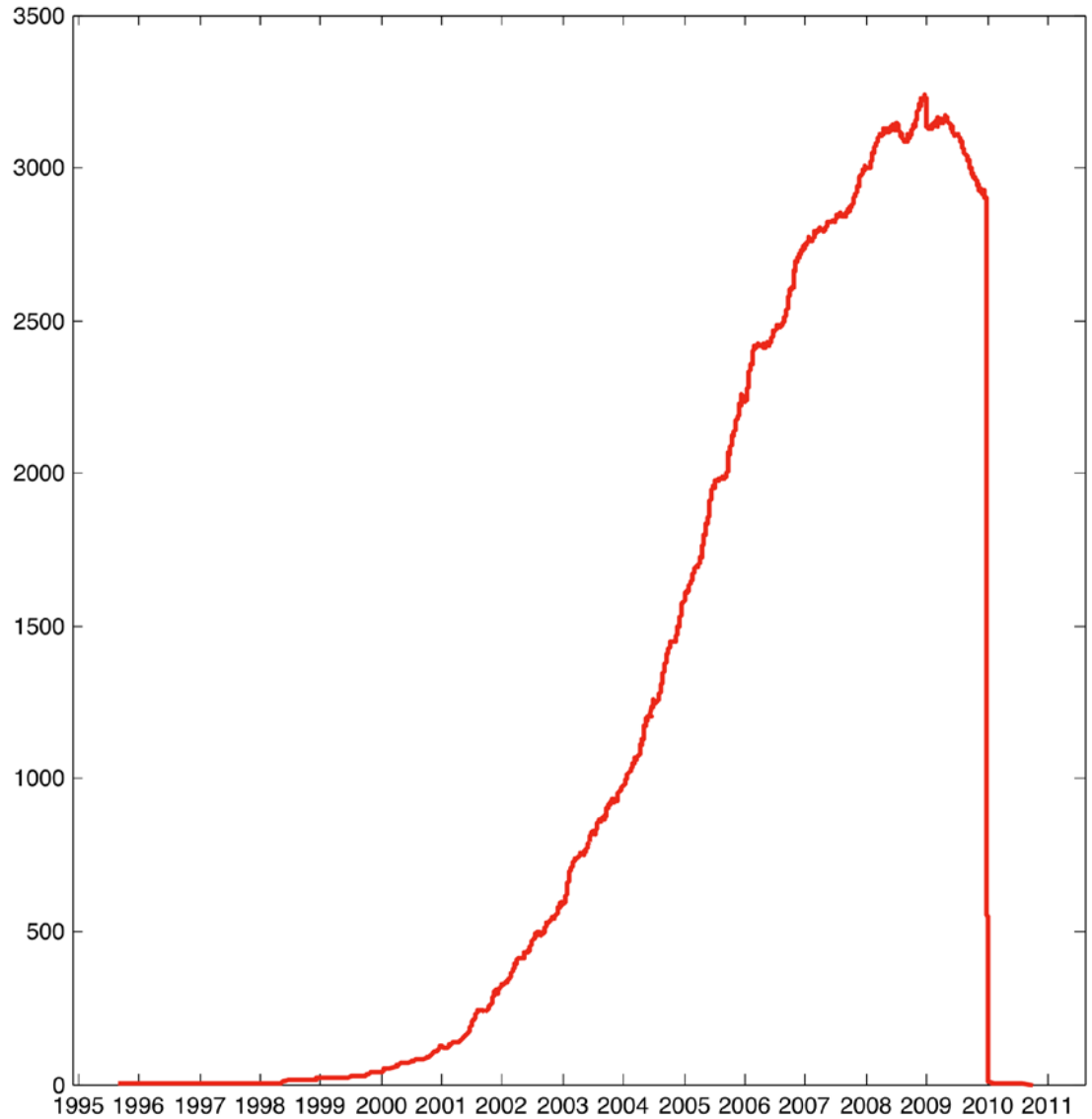
ANDRO World pressure distribution



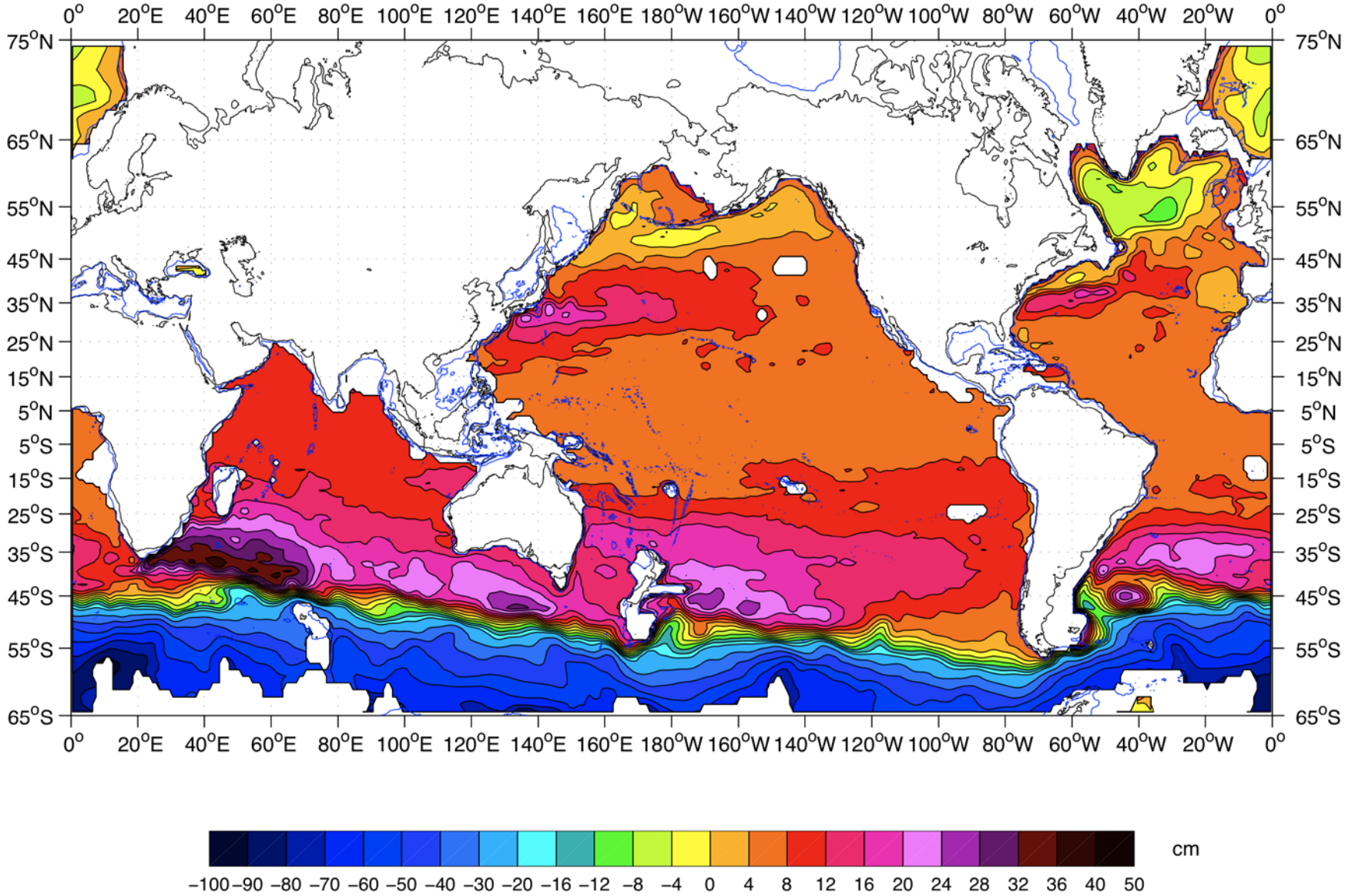
ANDRO World displacement duration distribution



ANDRO active floats at a given time



What can be achieved with good data?
e.g. the geopotential of the 1000 dbar surface



What should be done now

- Present ANDRO (until January 1 2010) content is 60% of the total Argo.
- 40% of the displacements are from the 3 years 2010 to 2012.
- To create and generate the ANDRO complement for January 2010 to December 2012 would cost 3x100 K€

How the costs may be dispached

- AOML 93.0 k€
- Coriolis 40.5 k€ We have funds to process Coriolis shortly
- JMA 31.5 k€
- CSIRO 16.5 k€
- BODC 14.0 k€
- MEDS 14.0 k€
- INCOIS 10.0 k€
- KORDI 9.0 k€
- KMA 9.0 k€
- CSIO 6.0 k€
- NMDIS 9.5 k€ ?

- TOTAL 253.0 k€ + new decoder development (47.0 k€)
  thus roughly 100 k€ per year

How ANDRO fits into the TRAJ3 development?

- Based on the DEP files, the TRAJ3 format is being defined, so that all relevant informations can be preserved to later obtain the best displacement estimates.
- However, no TRAJ3 has been generated yet, and when they will be, they are only R modal.
- Of course, in the future, they will be D mode.
- Presently, we can generate directly the D TRAJ3 from our DEP files (although the program has not been written yet since the TRAJ3 format was not finalised (Details in the following).

What is needed by scientists

- The best displacement estimates (with a validated parking pressure)
- The timely (i.e. regularly updated) and validated data (i.e. D modal)
- This is possible for the Argo trajectories, with a yearly and worldwide update, and 100 k€.
- Even if the CLS Argos or Iridium data were fully used, and perfect cycle affectation done, and with exact decoding by the DACs, there would remain a validation task (estimated to 70% of the time) to obtain an homogeneous data set to be directly used by scientists

  (the D TRAJ3 files)

Argo trajectory Delayed Mode data processing

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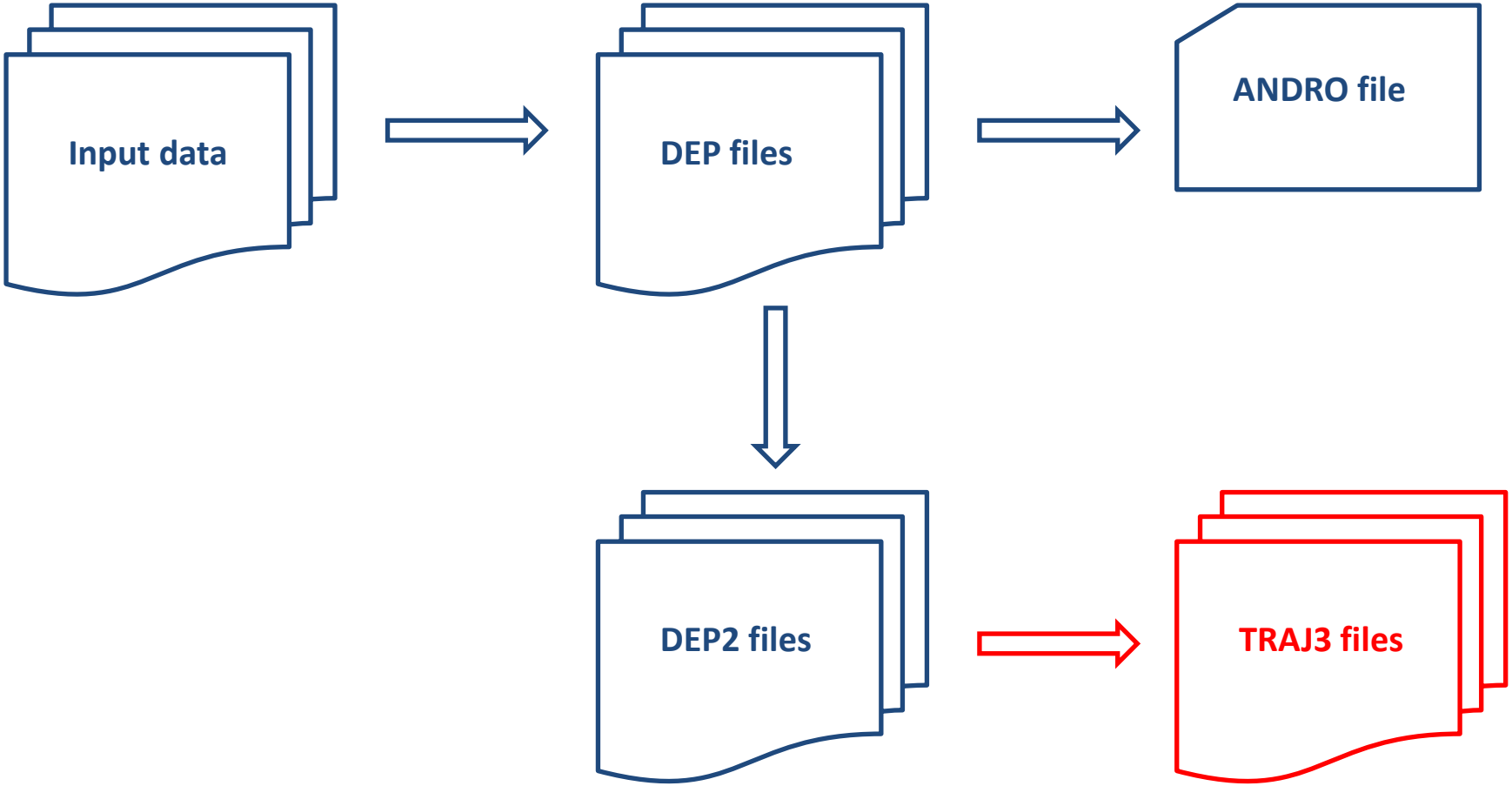
Trajectory Delayed Mode data processing



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Input data

1

NetCDF files:
(R)*wmo*_traj.nc
*wmo*_tech.nc
*wmo*_prof.nc
*wmo*_meta.nc

2

Meta-data:
float type/version
launch information
mission information

3

Argos (hex) data

Iridium data (SBD emails or rudics files)

Float type/version information come from *wmo*_meta.nc file and from DAC detailed meta-data (float user manual is highly desirable to identify the Argos/Iridium data format).
Argos (hex) data are provided by the DACs, they must be:
• As complete as possible (downloaded/received data in real time + monthly CD-Rom archived data),
• Provided without any DAC processing.

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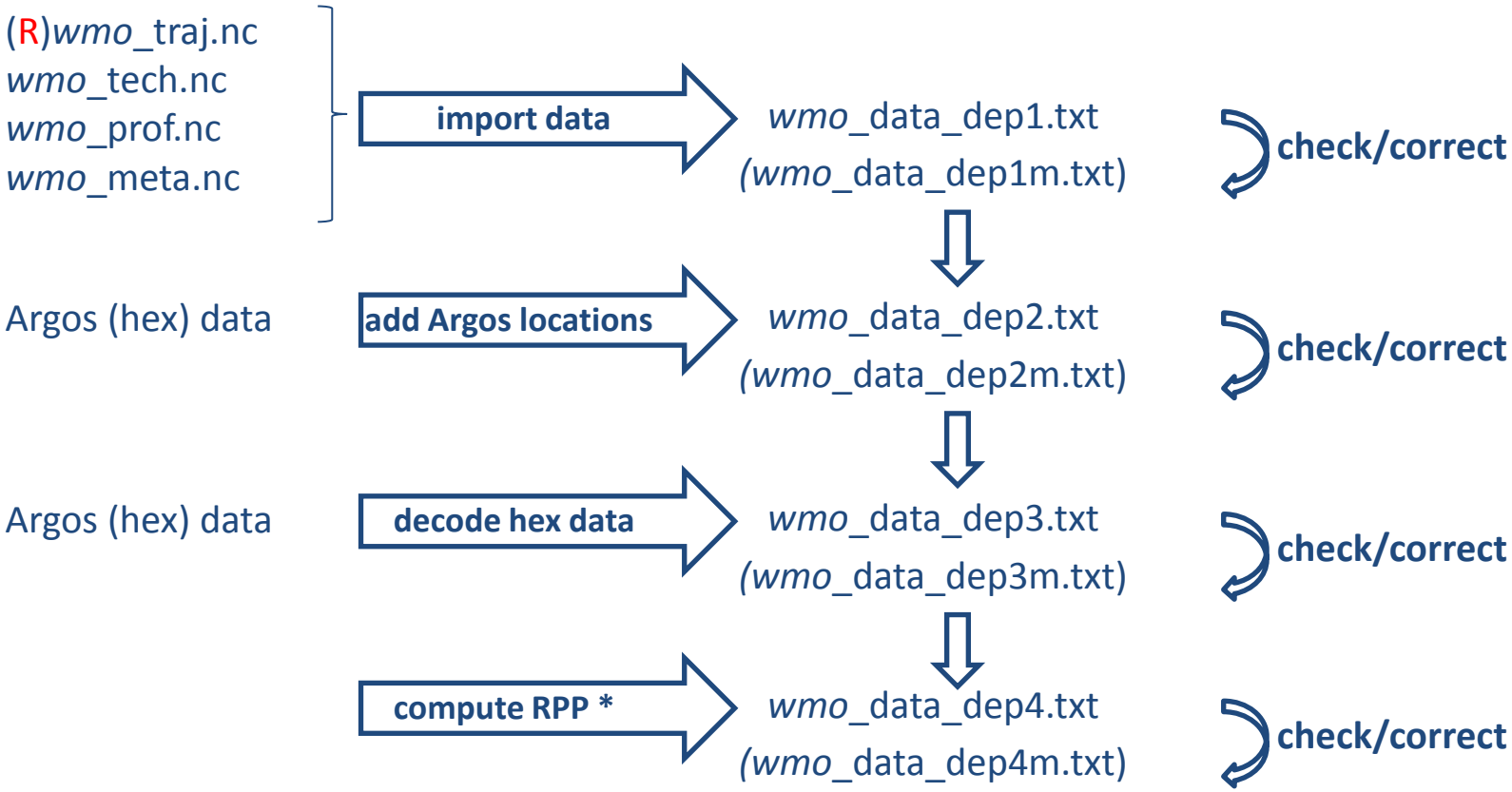
DEP files processing (1/2)



***RPP** (**R**epresentative **P**ark **P**ressure) is computed from pressure measurements done during the drift phase at parking depth.*

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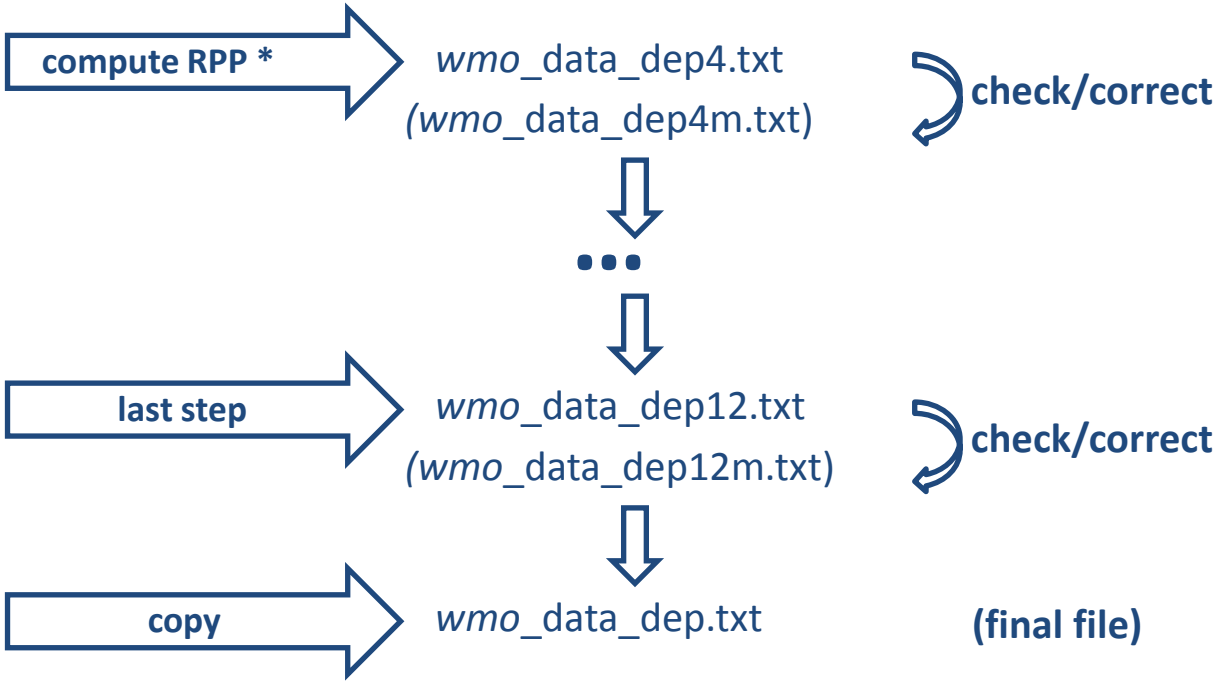
DEP files processing (2/2)



The number of processing steps depends on float version/type (12 in the above example is for an APEX APF8 float, there are less steps for PROVOR float which directly provides more information).
The order of the processing steps depends on each DAC.
The last step output file is duplicated to create the final file (*wmo*_data_dep.txt).

Only parameters Pressure, Temperature and Salinity are taken into account in the DEP files.

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ANDRO file generation

*wmo1*_data_dep.txt
*wmo2*_data_dep.txt
•••
*wmo6243*_data_dep.txt

generate → ANDRO_20121129.dat

There are presently 6 243 floats in the current DEP data set, but only 6 212 of them contribute to the 603 224 displacements of the ANDRO file.
During the generating process:
• Only good locations are used (GPS and Argos with classes 1, 2 or 3). Moreover the JAMSTEC QC trajectory test (test #20) is applied to reject bad fixes,
• Grounded cycles are excluded by the generating process.

In a DEP file, each (22 columns) line stands for **an event** that occurs during the float mission at sea.
In the ANDRO file, each (37 columns) line stands for **a subsurface and/or a surface displacement**. Each deep displacement is given with its depth (the RPP) and the associated temperature (if provided by the float in the measurements done during the drift phase at parking depth).

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Towards TRAJ3 files generation

In a DEP file, the data must remain easily readable for the processing operator. Consequently, the deleted data and the original values of modified data are not preserved.

In an Argo NetCDF file:

- Data are never deleted (they are flagged as 'bad'),
- Original values of modified data are preserved (in <PARAM> and <PARAM>_ADJUSTED variables).

To generate TRAJ3 files from DEP files we thus need a new file format to be able to gather the "history" of the corrections done on the data: this is the function of the DEP2 file format.

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DEP2 file format

Final data	Additional data	Original data
= *wmo*_data_dep.txt	POS_QC and RPP_QC	≈ *wmo*_data_dep***i***.txt

The final data part of the format contains the final *wmo*_data_dep.txt contents.

The original data part of the format contains original values of the data: a value is initialized the first time it appears (when imported from NetCDF files) but can be re-initialized if a decoding or a computing process generates it again. The original data are gathered from the *wmo*_data_dep***i***.txt files ("***i***" depends on the concerned information type).

Two QC are added in the DEP2 format: POS_QC (resulting from JAMSTEC QC test on trajectory) and RPP_QC (illustrating RPP creating process, and thus reliability).

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TRAJ3 files generation (to be done)

*wmo*_data2_dep.txt
+
float characteristics
+
corrected meta-data
+
clock drifts
+
…

generate → D*wmo*_traj.nc

The TRAJ(V3) file of each float is generated from:

- Its DEP2 file contents,
- The float characteristics, to identify unusual resolution of some information,
- The float meta-data, checked and corrected during the DEP file processing,
- The estimated clock drifts used to correct the times provided by the floats,
- …

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