

## OUTPACE SADCP Processing

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### Outline:

The OUTPACE SADCP files have been processed as follows. The initial dataset is retrieved from [OUTPACE@139.124.2.130](mailto:OUTPACE@139.124.2.130), in the directory /mnt/OUTPACE/DATABASE/SADCP/L0, where the .STA and .LTA files for both the 150kHz and 38 kHz files are located. These files have already been cut and corrected by Gilles Rougier onboard the *R/V L'Atalante* for the crossing of the international date line. The files were processed using the Cascade software, version 7.0, using the LATEX computer with Windows 7 installed and MATLAB 2015a. On the LATEX computer, the directory tree is as follows:

```
C:\Users\petrenko\Desktop\OUTPACE\ADCP\  
  → 38 or 150  
  → LTA or STA  
  → S(L)TA_38(150)_XX where XX is the file number
```

In each file directory, there is the original .STA or .LTA file which is used in Cascade.

### Cascade Processing Steps:

1. Open Matlab and change to the current file directory. Then start Cascade using the command “ce.” First, in Cascade the .STA or .LTA file and its directory selected and converted into netCDF files in the “Conversion des fichiers” tab.
2. Under “configuration”, the relevant fields are filled for the work directory, filename, bathymetry folder, and tide folder. The campaign name is OUTPACE, the ship is L'Atalante, and deVerneil is responsible for data treatment.
3. Under “Validation/Corrections” the follow occurs:
  - a. Definition de la couche: Couche de reference min/max = 3/8
  - b. Ajout de la bathymetrie: Etopo1 is used
  - c. Nettoyage: The default parameters are used here, set to
    - i. Seuil de l'erreur de la vitesse vertical: 20
    - ii. Cisaillement vertical max: 0.2
    - iii. Nombre de profils a considerer avant...: 30
    - iv. Nbre d ecart a la moyenne: 2.7
    - v. Detection du fond: Bathy
    - vi. V Max (cm/s): 200
    - vii. Seuil de correlation: 60
    - viii. % min d'ensemble bon: 10
  - d. Desalignement/Assiete: This is the tricky part.  
Switch to the “Analyse Fichiers Campagne” tab and click on “Calcul amplitude/desa....” If there is sufficient data (usually in the .STA files), then a suggested A, Phi, and Erreur d'tangage is

provided. **IMPORTANT: For A, Phi, here we used the suggested value provided by a concatenation of the files for the entire cruise, whereas for the “tangage,” this is determined by iteratively minimizing the average vertical velocity in each file until it is sufficiently small in magnitude, i.e.  $|w| \leq 1$  cm/s. The values found are provided in a table below.**

- e. Back in “Validations/Corrections” now continue to “Ajout de la maree.” Here we add the tide. (**Remember to change the active file in Cascade to the one that has the correction for A, Phi, and tangage in the “Configuration” tab).**
- f. Filtrage: Here we use only data flag 1, and filter both vertically and horizontally.
- g. Optimisation du fichier: The file is “optimized” and saved with all these corrections, it is now ready to use, if desired in a .seclist file to interpolate for stations or sections.

Now we close Cascade. Subsequently, the .nc files produced by Cascade are loaded, concatenated, and saved into the “OUTPACE\_ADCP\_38(150)\_S(L)TA.mat” file by the script “Load\_OUTPACE\_ADCP.m” These data are now designated L1.

Notes:

- For the OUTPACE campaign, the 150 kHz ADCP stopped collecting data around the LDB\_Before zig-zag, and so these data are not available. They are available, however, for the 38 kHz ADCP.
- For the 38kHz files, the 15<sup>th</sup> file is empty, and is subsequently ignored.

**Table 1. Suggested parameters for A, Phi, and tangage.** If there is insufficient data, then it is left blank (this is the case for all LTA files).

Parameters for A, Phi, and tangage:

| Frequency | File format | File | Phi          | Amplitude    | Tangage |
|-----------|-------------|------|--------------|--------------|---------|
| 150       | STA         | 00   | N/A          | N/A          | 0.1     |
| 150       | STA         | 01   | N/A          | N/A          | 0.1     |
| 150       | STA         | 02   | <b>-0.62</b> | <b>1.019</b> | 0.1     |
| 150       | STA         | 03   | N/A          | N/A          | N/A     |
| 150       | STA         | 04   | <b>-0.67</b> | <b>1.009</b> | -0.5    |
| 150       | STA         | 05   | <b>-1.46</b> | <b>1.023</b> | 0.0     |
| 150       | STA         | 06   | N/A          | N/A          | 0.1     |
| 150       | STA         | 07   | N/A          | N/A          | 0.2     |
| 150       | STA         | 08   | <b>0.79</b>  | <b>1.010</b> | 0.1     |
| 150       | STA         | 09   | N/A          | N/A          | 0.1     |
| 150       | STA         | 10   | N/A          | N/A          | 0.1     |
| 150       | STA         | 11   | N/A          | N/A          | 0.2     |
| 150       | STA         | 12   | <b>1.41</b>  | <b>1.009</b> | 0.1     |
| 150       | STA         | 13   | <b>-0.34</b> | <b>1.014</b> | 0.1     |

|       |       |       |              |              |       |
|-------|-------|-------|--------------|--------------|-------|
| 150   | STA   | 14    | <b>0.63</b>  | <b>1.026</b> | 0.1   |
| 150   | STA   | 15    | N/A          | N/A          | -0.2  |
| 150   | STA   | 16    | <b>0.52</b>  | <b>1.016</b> | 0.1   |
| 150   | STA   | 17    | N/A          | N/A          | 0.2   |
| 150   | STA   | 18    | N/A          | N/A          | 0.1   |
| ----- | ----- | ----- | -----        | -----        | ----- |
| 150   | LTA   | 00    | N/A          | N/A          | 0.2   |
| 150   | LTA   | 01    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 02    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 03    | N/A          | N/A          | N/A   |
| 150   | LTA   | 04    | N/A          | N/A          | -1.0  |
| 150   | LTA   | 05    | N/A          | N/A          | 0     |
| 150   | LTA   | 06    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 07    | N/A          | N/A          | 0.2   |
| 150   | LTA   | 08    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 09    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 10    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 11    | N/A          | N/A          | 0.2   |
| 150   | LTA   | 12    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 13    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 14    | N/A          | N/A          | 0.0   |
| 150   | LTA   | 15    | N/A          | N/A          | -0.1  |
| 150   | LTA   | 16    | N/A          | N/A          | 0.1   |
| 150   | LTA   | 17    | N/A          | N/A          | 0.2   |
| 150   | LTA   | 18    | N/A          | N/A          | 0.1   |
| ----- | ----- | ----- | -----        | -----        | ----- |
| 38    | STA   | 00    | N/A          | N/A          | -0.2  |
| 38    | STA   | 01    | N/A          | N/A          | -0.1  |
| 38    | STA   | 02    | <b>-0.43</b> | <b>1.025</b> | -0.2  |
| 38    | STA   | 03    | N/A          | N/A          | N/A   |
| 38    | STA   | 04    | <b>0.57</b>  | <b>1.010</b> | -0.3  |
| 38    | STA   | 05    | <b>-1.17</b> | <b>0.979</b> | -0.4  |
| 38    | STA   | 06    | N/A          | N/A          | -0.2  |
| 38    | STA   | 07    | N/A          | N/A          | -0.3  |
| 38    | STA   | 08    | <b>1.37</b>  | <b>1.000</b> | -0.3  |
| 38    | STA   | 09    | N/A          | N/A          | -0.2  |
| 38    | STA   | 10    | N/A          | N/A          | -0.2  |
| 38    | STA   | 11    | <b>0.52</b>  | <b>0.980</b> | -0.1  |
| 38    | STA   | 12    | <b>-0.30</b> | <b>1.000</b> | -0.5  |
| 38    | STA   | 13    | <b>-0.59</b> | <b>0.983</b> | -0.2  |
| 38    | STA   | 14    | <b>-0.13</b> | <b>0.995</b> | -0.3  |
| 38    | STA   | 15    | N/A          | N/A          | N/A   |
| 38    | STA   | 16    | <b>0.06</b>  | <b>0.994</b> | -0.4  |
| 38    | STA   | 17    | <b>-0.48</b> | <b>1.010</b> | 0.0   |
| 38    | STA   | 18    | N/A          | N/A          | -0.3  |

|       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|
| 38    | STA   | 19    | N/A   | N/A   | -0.2  |
| ----- | ----- | ----- | ----- | ----- | ----- |
| 38    | LTA   | 00    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 01    | N/A   | N/A   | -0.1  |
| 38    | LTA   | 02    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 03    | N/A   | N/A   | N/A   |
| 38    | LTA   | 04    | N/A   | N/A   | 0.2   |
| 38    | LTA   | 05    | N/A   | N/A   | -0.4  |
| 38    | LTA   | 06    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 07    | N/A   | N/A   | -0.3  |
| 38    | LTA   | 08    | N/A   | N/A   | -0.3  |
| 38    | LTA   | 09    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 10    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 11    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 12    | N/A   | N/A   | -0.5  |
| 38    | LTA   | 13    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 14    | N/A   | N/A   | -0.2  |
| 38    | LTA   | 15    | N/A   | N/A   | N/A   |
| 38    | LTA   | 16    | N/A   | N/A   | -0.7  |
| 38    | LTA   | 17    | N/A   | N/A   | 0.1   |
| 38    | LTA   | 18    | N/A   | N/A   | -0.3  |
| 38    | LTA   | 19    | N/A   | N/A   | -0.2  |

**Table 2. Cascade's Suggestions for the entire cruise:**

| Frequency | File type |  | Phi   | Amplitude | Tangage |
|-----------|-----------|--|-------|-----------|---------|
| 150       | STA       |  | 0.09  | 1.013     | 0.1     |
| 150       | LTA       |  | N/A   | N/A       | 0.1     |
| 38        | STA       |  | -0.00 | 1.000     | -0.0    |
| 38        | LTA       |  | N/A   | N/A       | -0.2    |

**Table 3. Parameters used for OUTPACE:**

150 kHz: Use Phi = 0.09, Amplitude = 1.013

38 kHz: Use Phi = 0.00, Amplitude = 1.0

| Frequency | File type | File | Tangage | w (cm/s) | w bins | w (cm/s) |
|-----------|-----------|------|---------|----------|--------|----------|
| 150       | STA       | 00   | 0.1     | 0.016    | 24 28  | 0.263    |
| 150       | STA       | 01   | 0.1     | -0.272   | 9 13   | 0.042    |
| 150       | STA       | 02   | 0.1     | -0.528   | 24 28  | -0.597   |
| 150       | STA       | 03   | -2      | -0.472   | 24 28  | -0.963   |
| 150       | STA       | 04   | -2      | -0.574   | 25 29  | -0.956   |
| 150       | STA       | 05   | -0.6    | -0.635   | 25 29  | -0.940   |
| 150       | STA       | 06   | 0.1     | -0.090   | 25 29  | -0.141   |

|       |       |       |       |        |       |        |
|-------|-------|-------|-------|--------|-------|--------|
| 150   | STA   | 07    | 0.1   | -0.136 | 25 29 | -0.125 |
| 150   | STA   | 08    | 0.1   | -0.098 | 24 28 | -0.223 |
| 150   | STA   | 09    | 0.1   | 0.005  | 19 23 | 0.247  |
| 150   | STA   | 10    | 0.1   | 0.036  | 19 23 | 0.340  |
| 150   | STA   | 11    | 0.1   | 0.530  | 21 25 | 0.874  |
| 150   | STA   | 12    | -0.5  | -0.813 | 11 15 | -0.737 |
| 150   | STA   | 13    | 0.1   | 0.040  | 19 23 | 0.244  |
| 150   | STA   | 14    | 0.1   | -0.829 | 10 14 | -0.574 |
| 150   | STA   | 15    | -3    | 0.244  | 20 24 | -0.718 |
| 150   | STA   | 16    | 0.1   | -0.370 | 11 15 | 0.095  |
| 150   | STA   | 17    | 0.1   | -0.212 | 14 18 | 0.205  |
| 150   | STA   | 18    | 0.1   | 0.260  | 22 26 | 0.285  |
| ----- | ----- | ----- | ----- | -----  | ----- | -----  |
| 150   | LTA   | 00    | 0.1   | 0.096  | 9 13  | 0.605  |
| 150   | LTA   | 01    | 0.1   | -0.272 | 9 13  | 0.027  |
| 150   | LTA   | 02    | 0.1   | -0.548 | 24 28 | -0.669 |
| 150   | LTA   | 03    | -2    | -0.537 | 24 28 | -0.999 |
| 150   | LTA   | 04    | -2    | -0.605 | 25 29 | -0.985 |
| 150   | LTA   | 05    | -1    | -0.467 | 25 29 | -0.767 |
| 150   | LTA   | 06    | 0.1   | -0.087 | 25 29 | -0.144 |
| 150   | LTA   | 07    | 0.1   | -0.156 | 25 29 | -0.113 |
| 150   | LTA   | 08    | 0.1   | -0.087 | 24 28 | -0.247 |
| 150   | LTA   | 09    | 0.1   | 0.008  | 20 24 | 0.192  |
| 150   | LTA   | 10    | 0.1   | 0.038  | 20 24 | 0.148  |
| 150   | LTA   | 11    | 0.1   | 0.509  | 21 25 | 0.910  |
| 150   | LTA   | 12    | -0.5  | -0.843 | 11 15 | -0.754 |
| 150   | LTA   | 13    | 0.1   | 0.0053 | 20 24 | 0.182  |
| 150   | LTA   | 14    | 0.1   | -0.828 | 10 14 | -0.547 |
| 150   | LTA   | 15    | -3.5  | 0.313  | 19 23 | -0.537 |
| 150   | LTA   | 16    | 0.1   | -0.387 | 11 15 | 0.085  |
| 150   | LTA   | 17    | 0.1   | -0.208 | 14 18 | 0.210  |
| 150   | LTA   | 18    | 0.1   | 0.286  | 22 26 | 0.326  |
| ----- | ----- | ----- | ----- | -----  |       |        |
| 38    | STA   | 00    | -0.2  | -0.043 | 35 39 | 0.008  |
| 38    | STA   | 01    | -0.2  | -0.134 | 39 43 | 0.517  |
| 38    | STA   | 02    | -0.2  | -0.241 | 38 42 | -0.010 |
| 38    | STA   | 03    | 0     | -0.272 | 31 35 | -0.114 |
| 38    | STA   | 04    | 0     | -0.102 | 35 39 | 0.032  |
| 38    | STA   | 05    | 0     | -0.403 | 35 39 | -0.148 |
| 38    | STA   | 06    | -0.2  | -0.429 | 31 35 | -0.233 |
| 38    | STA   | 07    | -0.2  | -0.350 | 30 34 | -0.410 |
| 38    | STA   | 08    | -0.2  | -0.219 | 24 28 | 0.041  |
| 38    | STA   | 09    | -0.2  | -0.031 | 27 31 | -0.034 |
| 38    | STA   | 10    | -0.2  | 0.006  | 28 32 | 0.201  |
| 38    | STA   | 11    | 0     | -0.648 | 31 35 | -0.595 |

|       |       |       |       |        |       |        |
|-------|-------|-------|-------|--------|-------|--------|
| 38    | STA   | 12    | 0     | -0.321 | 34 38 | -0.190 |
| 38    | STA   | 13    | -0.2  | -0.164 | 33 37 | 0.028  |
| 38    | STA   | 14    | 0     | -0.574 | 34 38 | -0.455 |
| 38    | STA   | 15    | N/A   | N/A    | N/A   | N/A    |
| 38    | STA   | 16    | 0     | -0.532 | 7 11  | -0.590 |
| 38    | STA   | 17    | 0     | -0.397 | 34 38 | 0.258  |
| 38    | STA   | 18    | -0.2  | -0.060 | 21 25 | -0.342 |
| 38    | STA   | 19    | -0.2  | -0.375 | 25 29 | 0.077  |
| ----- | ----- | ----- | ----- | -----  | ----- | -----  |
| 38    | LTA   | 00    | -0.2  | 0.005  | 36 40 | 0.061  |
| 38    | LTA   | 01    | -0.2  | -0.105 | 39 43 | 0.536  |
| 38    | LTA   | 02    | -0.2  | -0.232 | 39 43 | 0.007  |
| 38    | LTA   | 03    | -0.2  | -0.206 | 31 35 | -0.040 |
| 38    | LTA   | 04    | -0.2  | -0.039 | 35 39 | 0.133  |
| 38    | LTA   | 05    | -0.2  | -0.303 | 35 39 | -0.039 |
| 38    | LTA   | 06    | -0.2  | -0.426 | 39 43 | 0.001  |
| 38    | LTA   | 07    | -0.2  | -0.335 | 29 33 | -0.431 |
| 38    | LTA   | 08    | -0.2  | -0.203 | 23 27 | 0.069  |
| 38    | LTA   | 09    | -0.2  | 0.033  | 28 32 | 0.008  |
| 38    | LTA   | 10    | -0.2  | 0.017  | 19 23 | 0.073  |
| 38    | LTA   | 11    | -0.2  | 0.222  | 27 31 | 0.304  |
| 38    | LTA   | 12    | -0.2  | -0.225 | 34 38 | -0.065 |
| 38    | LTA   | 13    | -0.2  | -0.138 | 33 37 | 0.020  |
| 38    | LTA   | 14    | -0.2  | -0.271 | 39 43 | 0.195  |
| 38    | LTA   | 15    | N/A   | N/A    | N/A   | N/A    |
| 38    | LTA   | 16    | -0.2  | -0.370 | 7 11  | -0.555 |
| 38    | LTA   | 17    | -0.2  | -0.243 | 36 40 | 0.966  |
| 38    | LTA   | 18    | -0.2  | -0.025 | 21 25 | -0.337 |
| 38    | LTA   | 19    | -0.2  | -0.332 | 25 29 | 0.089  |