

## README FILE for transit-time partitioned water-mass analysis for US GEOTRACES section GA03

This data was the result of the analysis reported in the following publication (HST2018):

Holzer, M., W. Smethie, and Y.-H. Ting (2018),

“Ventilation of the subtropical North Atlantic: Locations and times of last ventilation estimated using tracer constraints from GEOTRACES section GA03”,

J. Geophys. Research, 123, 2332-2352, doi:10.1002/2017JC013698.

The data is contained in two files, a matlab file **wmf\_ages\_GA03.mat** and an Excel file,

**wmf\_ages\_GA03.xlsx**. The same data is presented in both files for the 668 samples analyzed along the GA03 cruise track.

### wmf\_ages\_GA03.mat

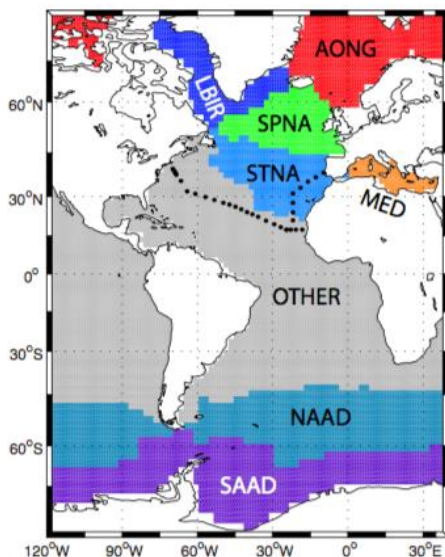
This file contains the single matlab structure **GA03**, which has the following double-precision fields:

field name	size precision	units
wmf_tau_all_yr	[668x8 double]	fraction of unity
wmf_tau_all_yr_uncert	[668x8 double]	fraction of unity
wmf_tau_le160yr	[668x8 double]	fraction of unity
wmf_tau_le160yr_uncert	[668x8 double]	fraction of unity
wmf_tau_le39yr	[668x8 double]	fraction of unity
wmf_tau_le39yr_uncert	[668x8 double]	fraction of unity
age_regional	[668x7 double]	years
age_regional_uncert	[668x7 double]	years
ideal_mean_age	[668x1 double]	years
ideal_mean_age_uncert	[668x1 double]	years
depth	[668x1 double]	m
lat	[668x1 double]	degrees north
lon	[668x1 double]	degrees east
dist_east	[668x1 double]	km

Water-mass fractions (wmf) are organized into 668x8 matrices: There are 668 bottle locations along section GA03 and the columns are the fraction of water last ventilated in one of 8 surface regions. These 8 surface regions (“patches”) have the following correspondences:

```
patch_name{1} = 'LBIR';  
patch_name{2} = 'AONG';  
patch_name{3} = 'SPNA';  
patch_name{4} = 'STNA';  
patch_name{5} = 'MED';  
patch_name{6} = 'NAAD';  
patch_name{7} = 'SAAD';  
patch_name{8} = 'OTHER';
```

Definitions and maps of these regions from Figure 2 of HST2018 are shown below.



The eight surface regions that define the water masses analyzed: AONG (Arctic Ocean, Greenland, and Norwegian Seas), LBIR (Labrador and Irminger Seas), SPNA (SubPolar North Atlantic), STNA (SubTropical North Atlantic), MED (Mediterranean Sea), NAAD (North of the Antarctic Divergence), SAAD (South of Antarctic Divergence), and OTHER (the rest of the global sea surface). The black dots are the stations of GEOTRACES section GA03.

**GA03.wmf\_tau\_all\_yr** contains the fraction of water last ventilated in a given region regardless of the time elapsed since ventilation (in practice, younger than 4000 years).

**GA03.wmf\_tau\_le160yr** contains the fraction of water last ventilated in a given region a time less than or equal to 160 years ago.

**GA03.wmf\_tau\_le39yr** contains the fraction of water last ventilated in a given region a time less than or equal to 39 years ago.

**GA03.age\_regional** is the regional mean ventilation age and is reported for the first 7 regions as 668x7 matrices. (The regional mean ventilation age for OTHER is not reported because OTHER is the rest of the global sea surface not included in the 7 Atlantic regions.)

**GA03.ideal\_mean\_age** is a 668x1 matrix (i.e., a column vector), containing our estimate of the ideal mean age (regardless of last ventilation location) at each of the 668 bottle locations.

Fields whose names end in **\_uncert** are the ensemble standard deviations of the section-mean profiles of the corresponding fields.

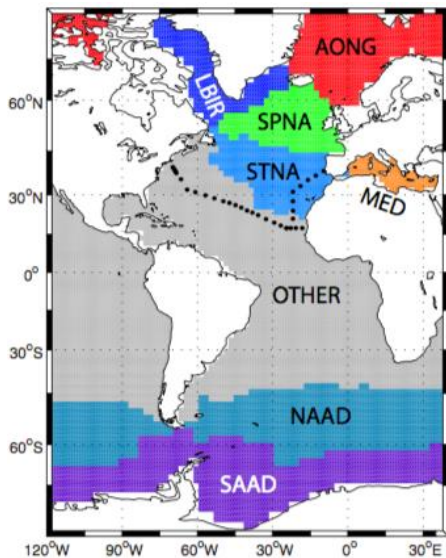
All the fields above are plotted and discussed in HST2018.

The coordinates of each of the 668 bottles are specified in terms of the vectors **GA03.depth**, **GA03.lat**, **GA03.lon**, and **GA03.dist\_east**.

## **wmf\_ages\_GA03.xlsx**

This Excel file is organized into 8 tabs and contains the same data that is in matlab file **wmf\_ages\_GA03.mat**.

Water-mass fractions and ages from 8 surface regions are presented in the excel file. Definitions and maps of these regions from Figure 2 of HST2018 are shown below.



The eight surface regions that define the water masses analyzed: AONG (Arctic Ocean, Greenland, and Norwegian Seas), LBIR (Labrador and Irminger Seas), SPNA (SubPolar North Atlantic), STNA (SubTropical North Atlantic), MED (Mediterranean Sea), NAAD (North of the Antarctic Divergence), SAAD (South of Antarctic Divergence), and OTHER (the rest of the global sea surface). The black dots are the stations of GEOTRACES section GA03.

**wmf\_tau\_all\_yr** contains the fraction of water last ventilated from a given surface region regardless of the time elapsed since ventilation (in practice, younger than 4000 years).

**wmf\_tau\_le160yr** contains the fraction of water last ventilated in a given region during a time less than or equal to 160 years ago.

**wmf\_tau\_le39yr** contains the fraction of water last ventilated in a given region during a time less than or equal to 39 years ago.

**age\_regional** contains the regional mean ventilation age (years) for each surface source component and is reported for the 7 surface source regions in the Atlantic Ocean. (The regional mean ventilation age for OTHER is not reported because OTHER is the entire ocean surface outside of the Atlantic.)

The four tabs whose names end in **\_uncert** are the ensemble standard deviations of the section-mean profiles of the corresponding fields.

The **ideal mean age (years)** calculated from the ages of the surface source water components is presented and repeated in all of the tabs.

The sample location, depth, station number, cast number, sample bottle number and date of collection are presented and repeated in each tab.