Forcings SAMOC and ITAMOC runs

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This document describes the forcings that were used for each of the SAMOC and ITAMOC runs. It was written to once and for all make sure that we use the correct forcings.

The next table shows the Surface Heat Flux (SHF) and the Surface Freshwater Flux (SFWF) files and the formulations that were used for each of the SAMOC runs. For all runs except for the control run both the sfwf and shf files have a +f or +flux in the filename. This means that we use applied flux instead of restoring under "ice". Mat ran the original control run from year 75 for 5 years with this restoring term on for both T and S and diagnosed the implied flux. He then made a monthly 5-year average of this and that is the +f or +flux term. The +g8 term in the sfwf forcing file stand for the added freshwater around Greenland.

SAMOC runs					
Run	**Description**	**SHF forcing file ***	**SHF formulation**	**SFWF forcing file ***	**SFWF formulation**
control	control run (at LANL)	shf.normal_year+Hurrell.monthly	normal-year	sfwf.CORE+runoff.monthly	bulk-NCEP, runoff
mixed_bc	Mixed bc run (at LANL)	shf.NY+H+f.mon	normal-year+flux	sfwf.CORE+runoff+flux_ mixed_bc.monthly	bulk-NCEP, runoff_and_flux
run_henk	Mixed bc run (at IMAU)	shf.NY+H+f.mon	normal-year+flux	sfwf.CORE+runoff+flux_ mixed_bc.monthly	bulk-NCEP, runoff_and_flux
prod_run1	First 0.1 Sv Greenland production run, wrong sw_mod_fact=0.875 (at IMAU)	shf.NY+H+f.mon	normal-year+flux	sfwf.C+r+g8+f.mon	bulk-NCEP, runoff_and_flux
prod_run2_mat	Correct 0.1 Sv Greenland production run (yr 75-115 at LANL, 115-125 at IMAU)	shf.NY+H+f.mon	normal-year+flux	sfwf.C+r+g8+f.mon	bulk-NCEP, runoff_and_flux
prod_run3_0.5Sv	0.5 Sv Greenland production run (at IMAU)	shf.NY+H+f.mon	normal-year+flux	sfwf.CORE+runoff+ greenland_0.5Sv+flux.monthly	bulk-NCEP, runoff_and_flux

* The forcing files of IMAU runs file are located on Huygens in /home/klipdccp/samoc/scripts/$Run/files_mat/forcing

The next table shows the Surface Heat Flux (SHF) and the Surface Freshwater Flux (SFWF) files and the formulations that were used for each of the ITAMOC runs.

ITAMOC runs					
Run	**Description**	**SHF forcing file ***	**SHF formulation**	**SFWF forcing file ***	**SFWF formulation**
run_clim_closeditf	Run with closed Indonesian ThroughFlow (ITF) and climatological (monthly mean) forcing (at Hector, in Edinburgh)	shf.NY+H+f.mon	normal-year+flux	sfwf.CORE+runoff+flux_ mixed_bc.monthly	bulk-NCEP, runoff_and_flux

All the SAMOC and ITAMOC runs are forced with the same windspeed file: ws.o_n_avg.mon.

SHF forcing fields

The binary SHF forcing file contains the following fields:

recs 1-12: restoring SST (C) (used only to determine location of sea ice)
recs 13-24: 10m atmospheric temperature (K)
recs 25-36: 10m atmospheric humidity (kg/kg)
recs 37-48: downward shortwave (W/m^2)
recs 49-60: downward longwave (W/m^2)
recs 61:72: 10m atmospheric wind speed (m/s)
recs 73:84 : Applied restoring heat flux (W/m^2)

Each field has 12 records representing the mean of each month in the climatology
only files with a +f or +flux in the filename contain the last 12 records 73-84
(i.e only the runs with formulation = normal-year+flux)

SFWF forcing fields

The binary SHF forcing file contains the following fields:

recs 1-12: restoring SSS (psu)
recs 13-24: precipitation (m/y)
recs 25-36: runoff (kg/m2/s)
recs 37-48: applied restoring S flux (kg/m2/s)

Each field has 12 records representing the mean of each month in the climatology
only files with a +f or +flux in the filename contain the last 12 records 37-48
(i.e only the runs with formulation = runoff_and_flux)

Below all fields in the SHF and SFWF forcing files are plotted for each run described in the tables above.

Also shown are the differences between runs:

1. prod_run3_0_5Sv - control
2. prod_run2_mat - control
3. run_henk - control (run_henk = the mixed_bc run)

4. prod_run3_0_5Sv - run_henk
5. prod_run2_mat - run_henk

6. prod_run3_0_5Sv - prod_run2_mat

These plots were automatically generated with the following scripts on Huygens:
~/samoc/scripts/old/mike/extract_field/samoc_itamoc_sfwf_shf_plots/SHF/check_shf.sc
~/samoc/scripts/old/mike/extract_field/samoc_itamoc_sfwf_shf_plots/SFWF/check_sfwf.sc

Conclusion

From the plots we can conclude that all SHF forcing fields are the same for each of the SAMOC as well as the ITAMOC runs. The control run has one field less in its forcing file (Applied restoring heat flux).

We can also conclude that the SFWF forcing fields are also the same for each of the SAMOC and ITAMOC runs except for the runoff field. The dumping of freshwater around Greenland in the prod_run2_mat (0.1 Sv) run and the prod_run3_0.5Sv (0.5 Sv) runs is done via the runoff field. This is the +g8 term in the first table above. The runoff field of these runs is the same as the runoff of the control run except for the Greenland region. Around Greenland the runoff of prod_run3_0.5Sv was expected to be exactly 5 times the runoff of prod_run2_mat but as the plots show there appear to be some roundoff issues.