Surface Forcing Requirements and Design

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Contents

Chapter 1

Summary

This document will describe the setup for surface forcing. Surface forcing includes wind stress, temperature, and salinity.

Chapter 2

Requirements

Requirements for surface forcing can be seen below:

- The forcing framework should provide capabilities to force temperature, salinity, and velocity at the surface.
- Forcing should be robust in terms of temporal frequency.
- The choice of temporal frequency should not change the variables that are used.
- Constant and monthly forcing should be provided with the ocean core.

These requirements will be used to create an infrastructure that will support robust forcing of the ocean surface. As mentioned, constant and monthly forcing will be provided with the ocean core but the framework created should allow this to be easily extended into other temporal frequencies.

Chapter 3

Design and Implementation

In order to support various types of forcing, a new grid dimension will be created and three variables will be modified.

```
dim nForcingTimeSlices
```

will be created in order to determine how many time slices there are within the forcing fields.

The variables below

```
u_src ( nVertLevels nEdges )
temperatureRestore ( nCells )
salinityRestore ( nCells )
windStressMonthly ( nMonths nEdges )
temperatureRestoreMonthly ( nMonths nCells )
salinityRestoreMonthly ( nMonths nCells )
```

will be changed into

```
windStress ( nEdges )
sstRestore ( nCells )
sssRestore ( nCells )
windStressField ( nForcingTimeSlices nEdges )
sstRestoringField ( nForcingTimeSlices nCells )
sssRestoringField ( nForcingTimeSlices nCells )
```

where nForcingTimeSlices can be changes based on the frequency of forcing data. As an example, 1 would represent constant forcing while 12 would represent monthly forcing.

The namelist variable config_use_monthly_forcing will be changed to config_forcing_interval. Rather than being a logical variable, it will be a character string. By default the ocean core will support options for 'monthly' and 'constant'. These can be extended later if needed.

Within this framework, the surfaceWindStresses, sstRestorings, and sssRestorings variables will be copied or interpolated (based on the choice of forcing frequency) into the surfaceWindStress, sstRestore, and sssRestore variables (respectively). These arrays are then used to perform the actual forcing within the ocean core.

Chapter 4

Testing

In order to test, we should ensure bit-for-bit reproduction of data compared with the current version of the trunk. Using both monthly and constant forcing methods.