

General comments

The manuscript is introducing a new generation of ocean circulation model coded in Python. If it is the first Python code for those applications, it would be interesting to mention it. If not, it would be relevant to introduce other similar applications.

Veros is based on a wide range of Python libraries. As this code will be used, for example, for educational purpose, can the authors detail the code management plan considering potential near future compatibility issues between those libraries ?

The Veros code is developed for single-node computation. Can the authors discuss the potential near future extent of the code for parallel computing (several nodes) and then more expensive applications ?

Despite the description of advantages of Python language, it seems that the code is mainly designed for educational purpose. Could the authors confirm this or detail those advantages in the manuscript ?

A last general comment is referring to the experiment. The choice of the model grid is surprising. It is not self explanatory why the straight meridional line is used in the Atlantic. It seems that coastline modification is manually modified outside Veros code and, then, it does not show Veros extended functionality as mentioned in section 4 (p. 14 « uncomplicated ways to modify the coastline »).

Specific comments

Page 1 :

line 5 : Please add « global » before « ocean model » as using a coarse resolution ($1^\circ \times 1^\circ$), 15 vertical levels over a global ocean are needed to reach one millions points.

Page 2 :

lines 5-10 : The authors suggest that there are more possible errors in Fortran programming. However, this is related to the technical rigour of the developer/user and of the strict application of good practices and Fortran norms as it should for developing a Python code. Please consider rephrasing those lines.

Page 4 :

ligne 8 : Why don't use Python 3.x which is now mature and ready to use ?

Page 6 :

paragraph 2.3 : using good practice, Fortran code could also be elegant and easily readable... Keep in mind that Fortran means **FOR**mula **TRAN**slator ! Please consider to be more factual in your remarks

Page 7 :

line 11-16 : Would it mean that user should use the appropriate algebra library depending on the size of the problem ? Numpy, PETSc, CUSP ? Or Veros chooses automatically the best one like in section 2.3.4 ?

line 17 : The authors refer to a following section. Could you consider to give more details to improve the readability ?

lines 29-30 : Indeed, I/O management is a main issue in many codes for now and in the future. Give more details on this output strategy.

Page 8 :

Line 1-5 : Is there a loss in accuracy with compress and decompress processes ?

Page 9 :

Line 15 : « certain tolerance » : Please, could you be more explicit on this point ?

Page 10 :

Line 28 : Which variables do you consider for those relative errors ?

Page 11 :

Line 13 : It sounds that a main drawback is that Bohrium can only be used in a single computational node. Have you any idea the schedule for parallelized implementation of Bohrium ?

Page 12 :

Figure 1.

- Bh CPU and Bh GPU curves can not be distinguished.
- I do not clearly understand what does the « line fit » for the MPI curve ?

Technical corrections

Page 6 :

line 12 : it seems the character – at the beginning at the line is not necessary.

Page 7 :

line 11 : it seems the character – in reference Jones et al is not necessary. (Idem page 20 line16)

line 17 : Move the AMG citation in the main text instead of in the footer note.

Page 10 :

Line 22 : « Sec. 2.3.7 » instead of « Sect. 2.3 »

Page 14 :

Line 5 : Replace « in ocean models : For » by « in ocean models. For »