



## Object-oriented numerics with FOSS: comparing PyPy & NumPy, GCC/Clang & Blitz++ and Gfortran

Dorota Jarecka (1), Sylwester Arabas (1), Maciej Fijalkowski (2), Anna Jaruga (1), and Davide Del Vento (3)

(1) University of Warsaw, Institute of Geophysics, Faculty of Physics, Warsaw, Poland (dorota@igf.fuw.edu.pl), (2) PyPy team, (3) Computational and Information Systems Laboratory, NCAR, Boulder, Colorado, USA

Employment of object-oriented programming (OOP) techniques may help to improve code readability, and hence its auditability and maintainability - both being arguably crucial for scientific software.

OOP offers, in particular, the possibility to reproduce in the program code the mathematical "blackboard abstractions" used in the literature. There exist a number of free and open-source tools allowing to obtain this goal without sacrificing performance.

An OOP implementation of the MPDATA advection algorithm used as a core of weather, ocean and climate modelling systems will serve as an example for briefly highlighting some relevant recent FOSS developments including:

- NumPy support in the PyPy just-in-time compiler of Python.
- the Blitz++ library coupled with the C++11 support in GCC and Clang;
- support for OOP constructs from Fortran 2003/2008 in GFortran;

A brief overview of other performance-related packages for Python like Numba and Cython will be also given.

This poster will describe and extends key findings presented in <http://arxiv.org/abs/1301.1334>