This talk

Study ECMWF's OpenIFS code.

- Academically available version of ECMWF's IFS forecast code.

- Spectral dynamical core, hydrostatic. Semi-implicit semi-Lagrangian time stepping.

- How important is numerical precision to forecast quality?

Emulated reduced precision

- Replace standard precision declaration with our derived types.

- Emulates arbitrary precision without large language/hardware changes (e.g. CUDA/FPGAs).

  - Increases run-time, only useful for investigation.

Standard Fortran:

REAL :: a,b,c
a = 1.442221
b = 2.136601
c = a+b
→ *c=3.578822*

Reduced precision declarations:

TYPE(reduced_precision) :: a,b,c
a = 1.442221
b = 2.136601
c = a+b
→ *c=3.562500*

Dawson and Düben 2016