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3D physics mechanism in AROME

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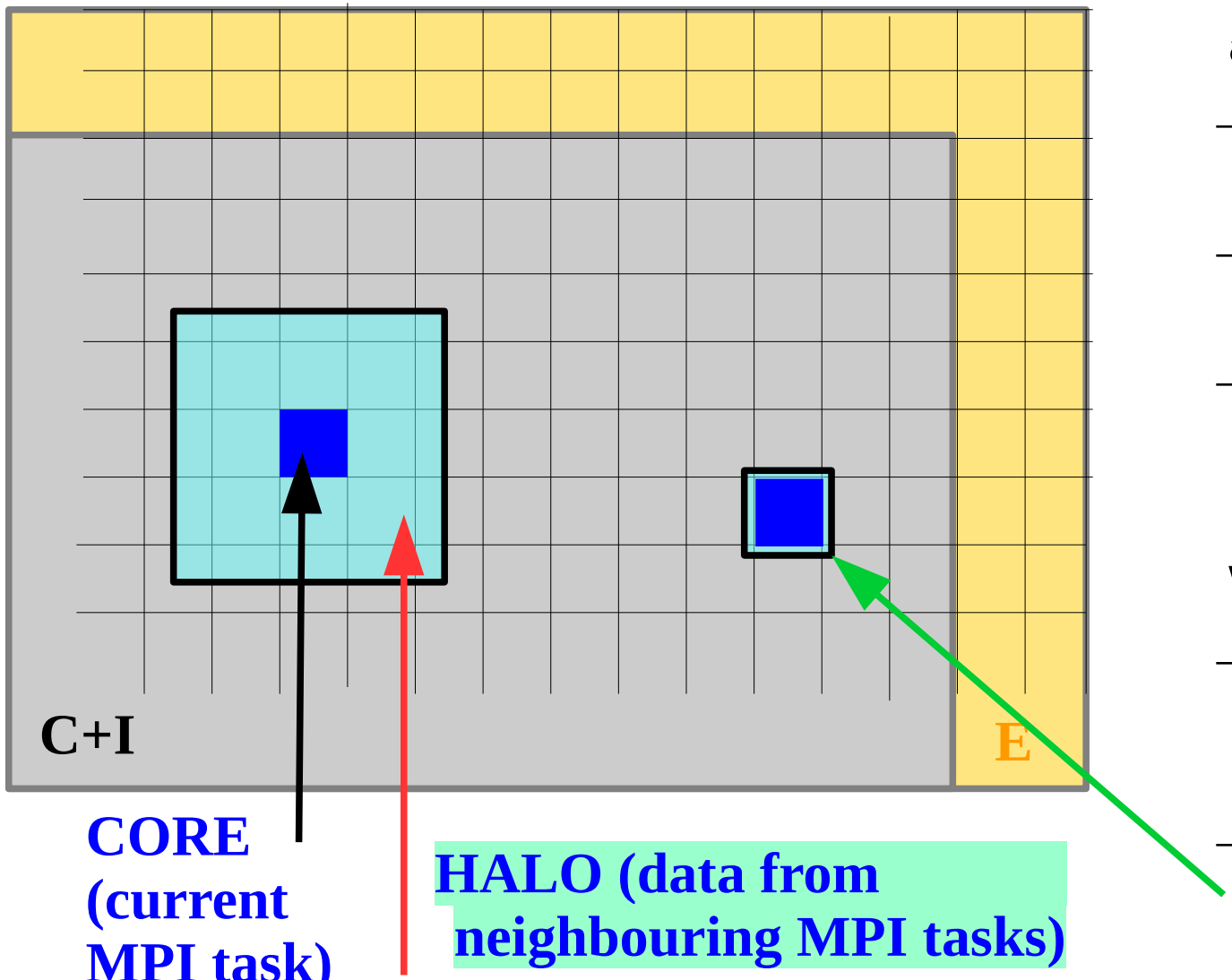
« Semi-lagrangian » halos for horizontal interpolations



« Semi-lagrangian » halos : also used for :

- Interpolations at observation points
- Interpolations at post-processing point
- Now used to compute gradients for 3D physics

Width of the halo :

- Potentially large (=> expensive) in Semi-lagrangian scheme
- Small for interpolations and gradients computation (1 or 2 rows only => cheap)

Calling tree for 3D physics (cycle 48t*) : setup

Control by the key **LGRADHPHY** in namelist NAMARPHY :

Call SUPHY

- Call SUPHMF

  NFLDCORE=6 ! (*Hard-coded*) 6 fields for differenciations in input

  NGRADIENTS=8 ! (*Hard-coded*) 8 horizontal gradients in output

- **Call SUPHYGR**
  - Call SLCSET ! setup halo infrastructure

Calling tree for 3D physics (cycle 48t*) : gridpoint dataflow

GP_MODEL_DRV

Allocate ZGRADPHY ! Gradients array

Call GP_MODEL(PGRADPHY=ZGRADPHY) ! Gridpoint computation

- **CALL GPGRADIENT(PGRADPHY)** ! **Gradients computation isolated here !**
  - loop on NPROMA blocks
    - Fill array with quantities to differenciate
  - Communications to fulfill halos with neighbouring points
  - Loop on NPROMA blocks
    - Differenciations to get gradients

- CALL CPG_DRV(PGRADIENT=PGRADPHY) ! **Computed gradients used there**
  - loop on NPROMA blocks
    - Call CPG(PGRADH_PHY=PGRADIENT(:, :, :,IBL))
      - Call MF_PHYS(PGRADH_PHY)
        - Call APL_AROME(**PTURB3D=PGRADH_PHY**)