ALARO-1 Working Days

Overview and Input for the final discussion

ALARO-1 Working Days

Transversal talks

- **generic equations and phys-dyn interfacing**
- **physics time step organisation**
- **3D turbulence**
- **DDH**
- **Object-Oriented Prediction System (OOPS)** restructuring the IFS

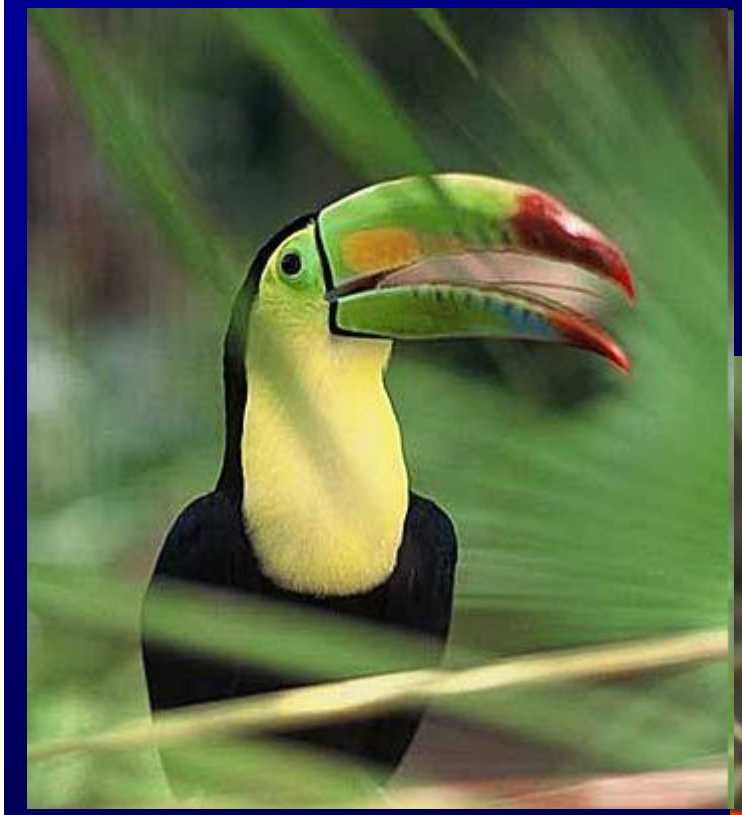
Radiation ACRANEB

- NER, cloud optical properties, Voigt effect, climatology for aerosols' optical properties
- Refining of gaseous transmission functions
- Correction for composite of gases

ToDo

- review the solar gaseous transmission functions
- More spectral intervals as possibility
- development of a time intermittent scheme:
  - principle of constant gaseous opt. depths within N integration time steps
  - clear-sky fluxes at the beginning of each updating period are exact
  - interaction with clouds can be recomputed in every time step (without excessive CPU burden)

TOUCANS



TOUCANS - Turbulence and diffusion

- Turbulent scheme
- Mixing lengths
- Preparations for TOM's terms
- Shallow convection cloudiness

Find solution for

- The influence of moisture on buoyancy via density effects
- computation of the TOM's terms for q_t in case of non-zero SCC

3MT prognostic updraft

Convergence of the 3MT deep convection parameterization with the explicit convection at high resolution

- **Cloud evolution**
  - **BBR** Bjeknes buoyancy-reduction
  - Cloud top evolution is described with activity index
- **Closures**
  - MOCON steady-state closure
  - CAPE diagnostic closure

Phase changes

- **Rasch-Kristjansson**
  - **evolution to TOUCANS loop**
- **ICE3 equations**
  - **analyse is ongoing**
    - **28 processes**
    - **graupel**

3D turbulence

Proposed scheme

- Horizontal part can be obtained from SLHD
- Still open issues to be addressed

takes into account

- respect to existing constraints, mainly model spatial and temporal resolutions.
- numerical robustness and efficiency
- most of the components exist

Generic equations and phys-dyn interfacing

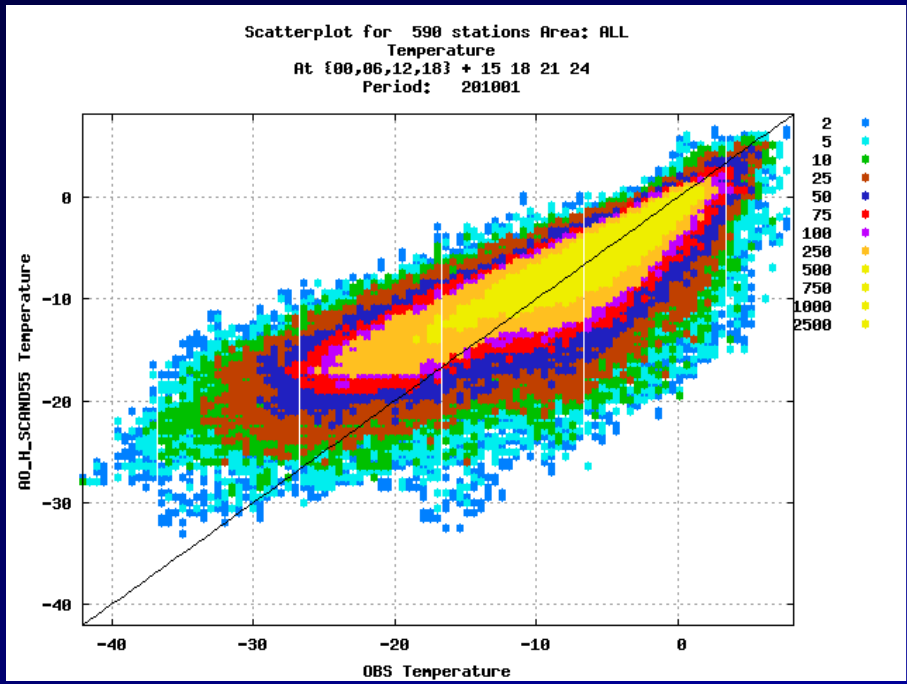
Several propositions are made to harmonize and generalize the physics-dynamics interface:

- cope with tendencies or pseudo-fluxes
- consider an arbitrary number of water species
- account for slow sedimentation of cloud species
- flexibility with process-based organization
- unification of negative humidity correction
- include different treatments of kinetic energy

ALARO-0 Experience

- **Austria, Belgium, Croatia, Czech Republic, Romania, Slovenia, Sweden, Turkey**

- **T2M under calm, clear sky winter conditions**
- **Deep convection onset**
- **…**



Exercises

- **Microphysics code (APLMPHYS)**
  - **Bug - partly explaned**
  - **ICE3 – analyse of the calling tree**
  - **Statistical sedimentation – inconsistency aladin/alaro**

    More problems found?
- **TOUCANS**
  - **one switch for eTKE**

ALARO-1 plan

Convection

- Developments and further validation - Luc
- Validation, testing, debuging, preparation for phasing - Doina, Radmila

TOUCANS

- Developments and coding - JFG, Ivan, Filip
- Validation, testing, debuging, help needed

ALARO-1 plan

Radiation – waiting

ICE3 physics - Meral

RK in ALARO-1 algorithm analysis brainstorming

Cloudiness

logistic of academic validation to install urgently (touches all developments)

3D turbulence - Filip, Jan, Ivan

ALARO-1 plan

DDH – validation for ALARO

Phys-dyn interface – small proto-type to learn the idea about process architecture

Questions for discussion

Developments/improvements, sophistication of the process description

Delaying factors (improving ALARO-0 at the expense of calendar of ALARO-1)?

Early diagnostics?

How to organize?