

Associated fields in COSMO: What to do?

Scientific programmer/regio. climate modeler at C2SM
Background in environmental science and engineering

Developments in COSMO and related tools

User support -> don't hesitate to ask for help

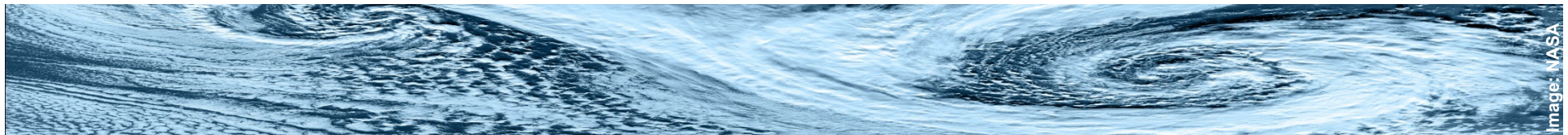
Project work

Code maintenance (SVN)

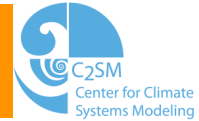
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COSMO User Workshop, Zürich

November 1, 2012



Fields in a NWP/climate model



- Prognostic variables qv
- Boundary values for these variables qv_bd
- Tendencies for these variables (time derivatives)
 $qvtens, qvt_conv, dqvdt, \dots$
- Fluxes $qvsflx$
- Emissions
- Surface field qv_s
- Derived quantities (integrals, at a specific height, ...)
 qv_2m, \dots

The problem



- Example for associated fields in COSMO:

$$qv = qv + qvtens * dt$$

$$qc = qc + qctens * dt$$

$$qi = qi + qitens * dt$$

- Need of generalization if lots of tracers (e.g. ART):

```
DO i = 1, n_var
  X(i) = X(i) + Xtens(i) * dt
ENDDO
```

- Similar with other fields (emissions):

$$X = X + X_E * dt$$

Need a “link” between a variable and its associated fields

A field in COSMO (for I/O)



- Has to have an entry in the **var** structure (in `src_setup_vartab.f90`)
- **var** is of a datatype looking like:

```
TYPE ar_des
  CHARACTER(LEN=10)          :: name
  REAL(KIND=ireals), POINTER :: p4   (:,:, :, :), p3   (:,:, :), p2   (:,:)
  REAL(KIND=ireals), POINTER :: p4_bd(:,:, :, :), p3_bd(:,:, :), p2_bd(:,:)
  additional information
END TYPE ar_des
```

```
var(3, 51,1)=ar_des('QV' , ..., qv , qv_bd, dum3 , dum3 , dum2, ...)
```

```
var(1, 51,1)=ar_des('QV_S', ..., dum4, dum4 , qv_s , qv_s_bd, dum2, ...)
```

```
“var(1,112,1)=ar_des('QV_E', ..., dum4, qv_e , dum3 , dum3 , dum2, ...)”
```

In the I/O routines, variables are accessed either by their name or by their GRIB info

**Who has an idea for handling associated fields
without rewriting completely the I/O routines?**

**I'm interested to discuss with anybody having
experience in dealing with emissions!**