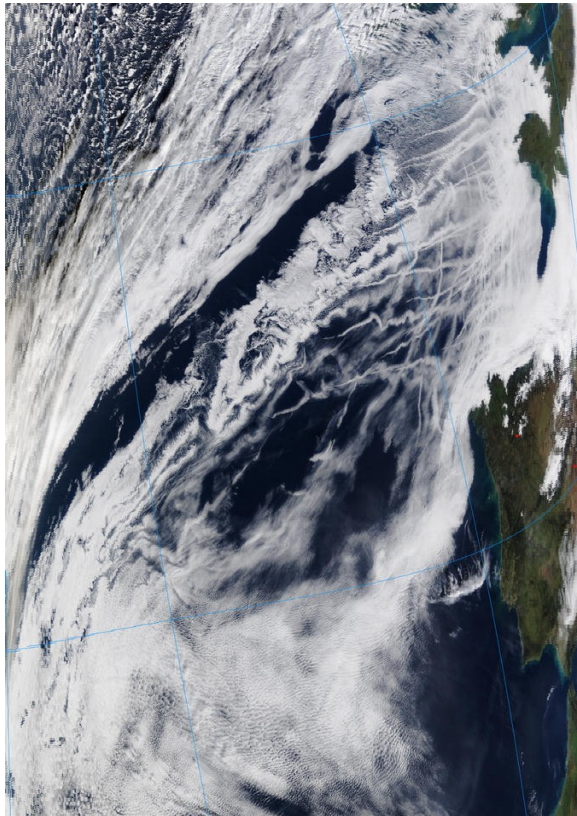
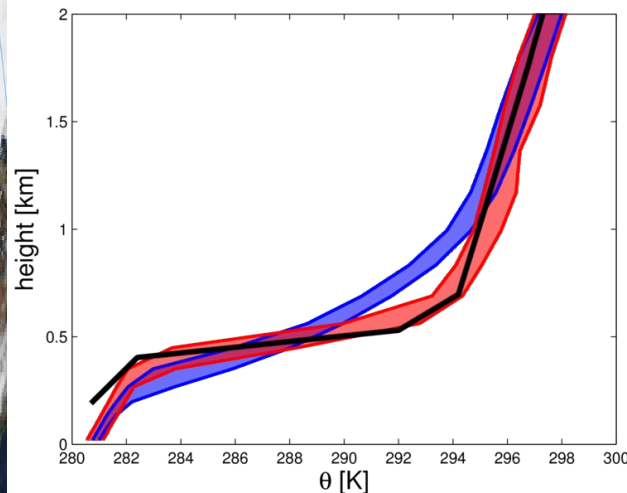


Studying marine stratocumulus and ship tracks in the Bay of Biscay using COSMO



12 UTC 27.01.2003
Bay of Biscay

Focus: 1) warm-phase cloud and aerosol microphysics
2) turbulence of stratified boundary layers (BL)



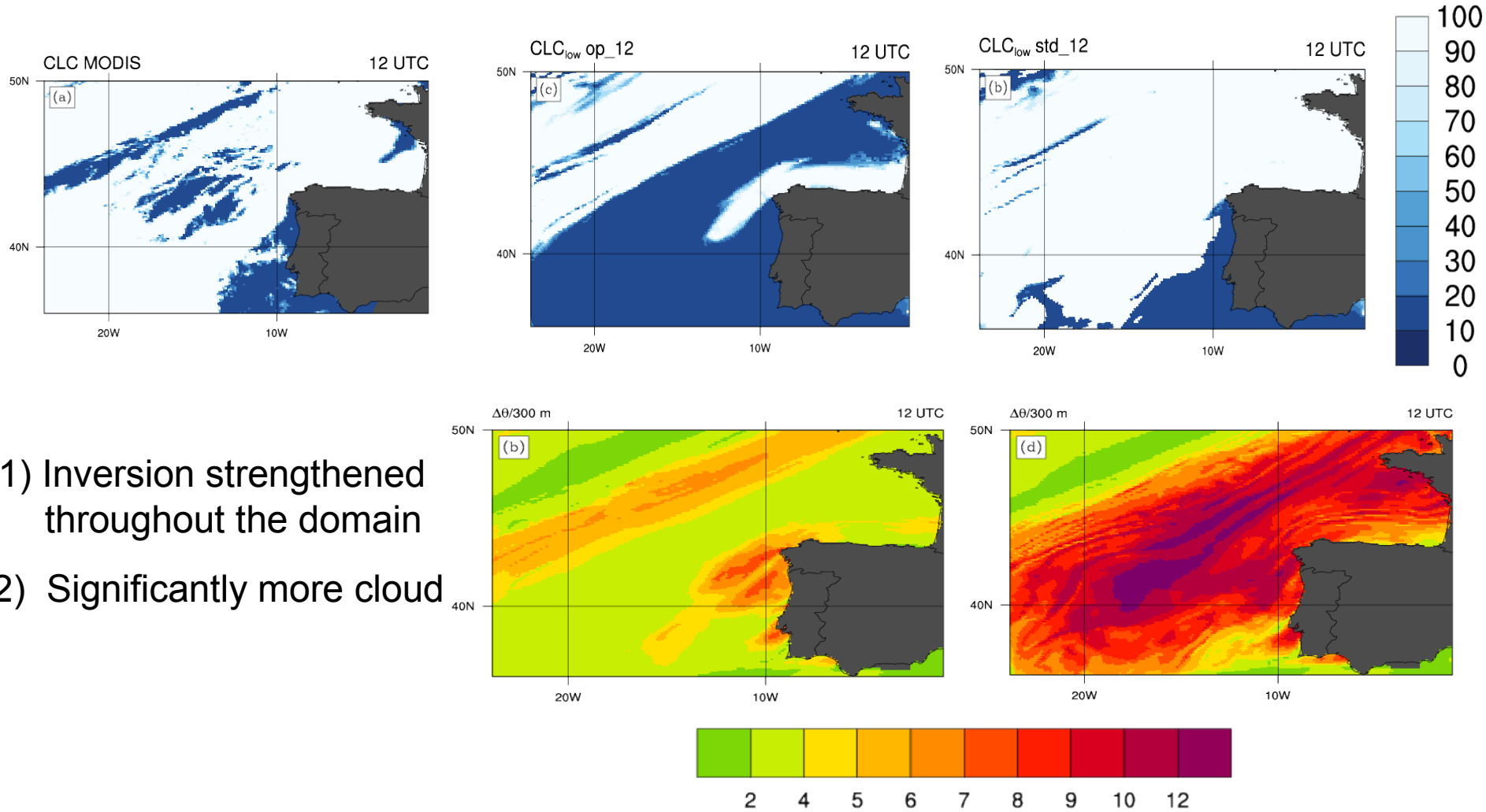
00 UTC 27.01.2012
 θ Profile distribution for 50 km
Radius around Brest

Blue – op_12km Red – tkmin_12km

Setup:

- 12 km and 2km simulations
- MeteoSwiss operational setup
- *Seifert & Beheng (2006)* 2-moment cloud microphysics
- M7 – aerosol microphysics (*Zubler et al 2011*)
- $TKHMIN=TKMMIN=0.01 \text{ m/s}^2$ (*Buzzi et al 2011*)

Some Results

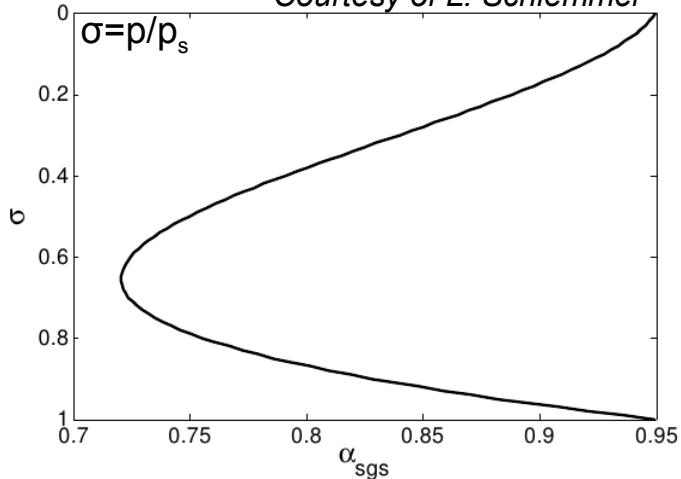


- 1) Inversion strengthened throughout the domain
- 2) Significantly more cloud

Technical Aspects – Cloud Fraction in Radiation

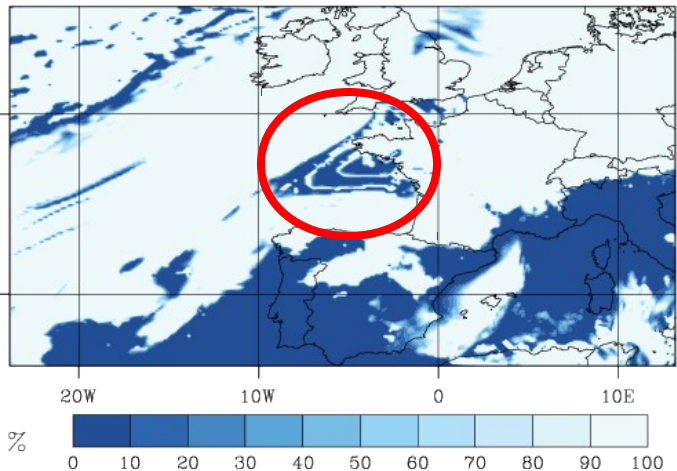
RH-based criterium:

Courtesy of L. Schlemmer



Low Cloud Fraction

2003012712



Determine SGS Cloud Fraction (zcs) based on RH – criterium

Oddity #1

```
...
IF ( qc(l,j,k,nzx) > 0.0_ireals ) THEN
  IF ( llandmask(i,j) .AND. k < ke) zcs = 1.0_ireals
ENDIF
```

...

! Store grid-scale cloud cover on global array
 $clc_sgs(i,j,k) = zcs$

⇒ **grid-scale clouds over water ignored**

Determine cloud water (qc)

Oddity #2

```
...
!Check for grid-scale water
zclws=0.0_ireals
IF ( qc (i,j,k,nzx) > 0.0) THEN
  zclws = MAX (zclws, 0.5_ireals*qc(i,j,k,nzx))
ENDIF
```