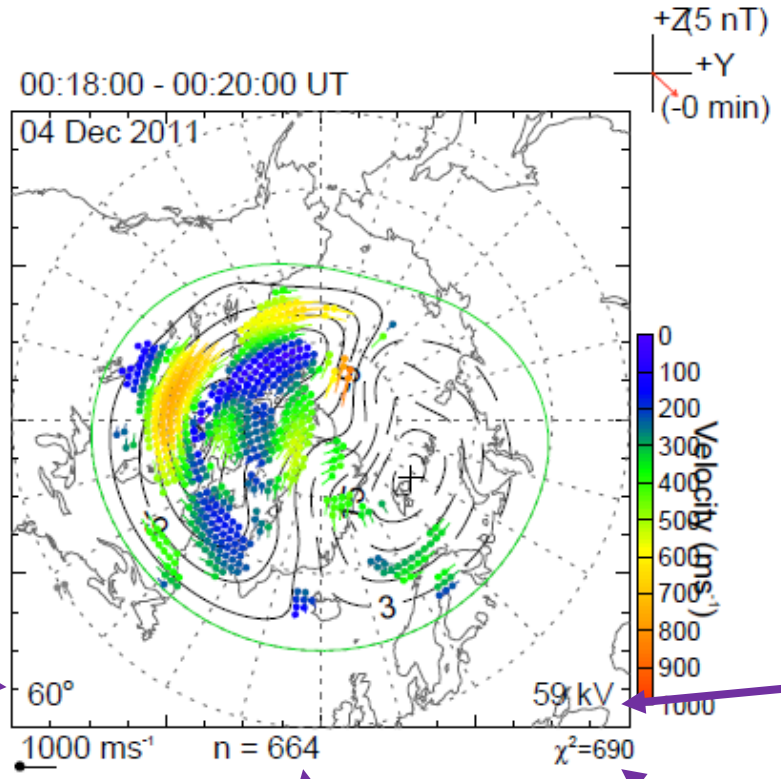
FitACF 2.5 vs 3.0: affect on convection maps

A. R. Fogg, M. Lester, T. K. Yeoman

Processing options

- RST version 4.2 used for all processing
- All available radar data has been included
- FitACF processing:
  - Make_fit –fitacf-version 2.5
  - Make_fit –fitacf-version 3.0
- Map potential flags:
  - Model: RG96
  - Traditional HMB latitude determination (3 vectors of 100ms^{-1})
  - 2 minute resolution
- OMNI IMF data used

Key



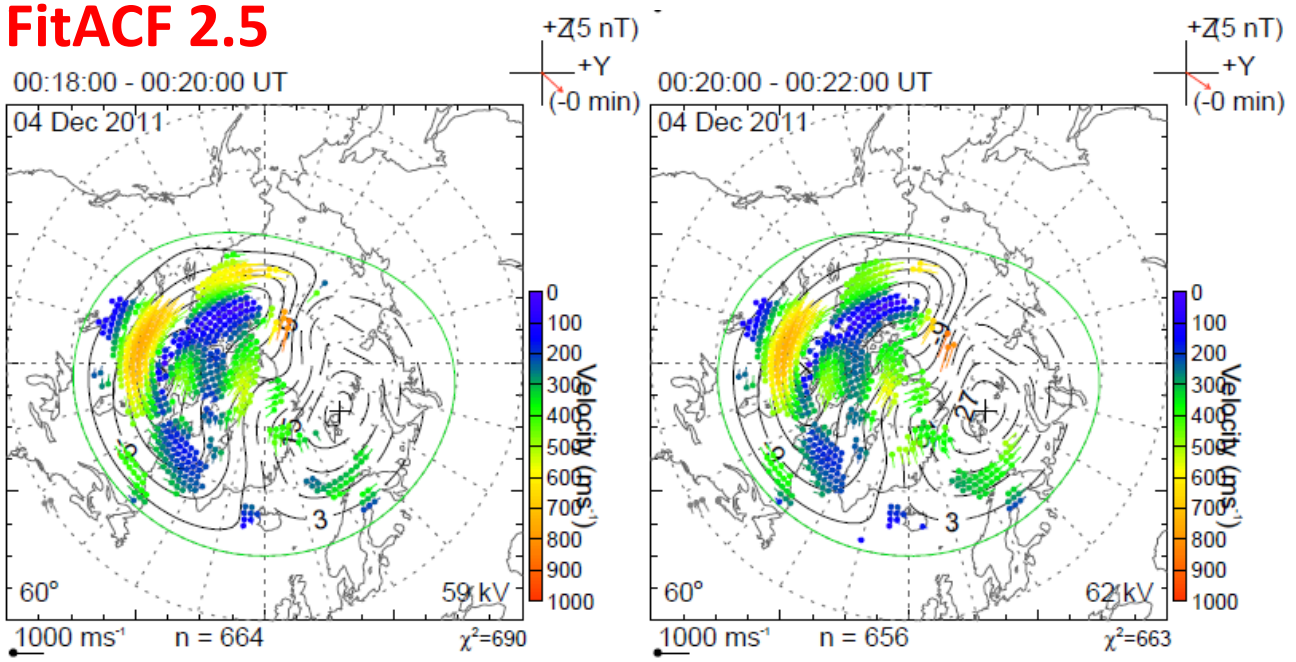
HMB 0000 MLT latitude

Cross Polar Cap Potential

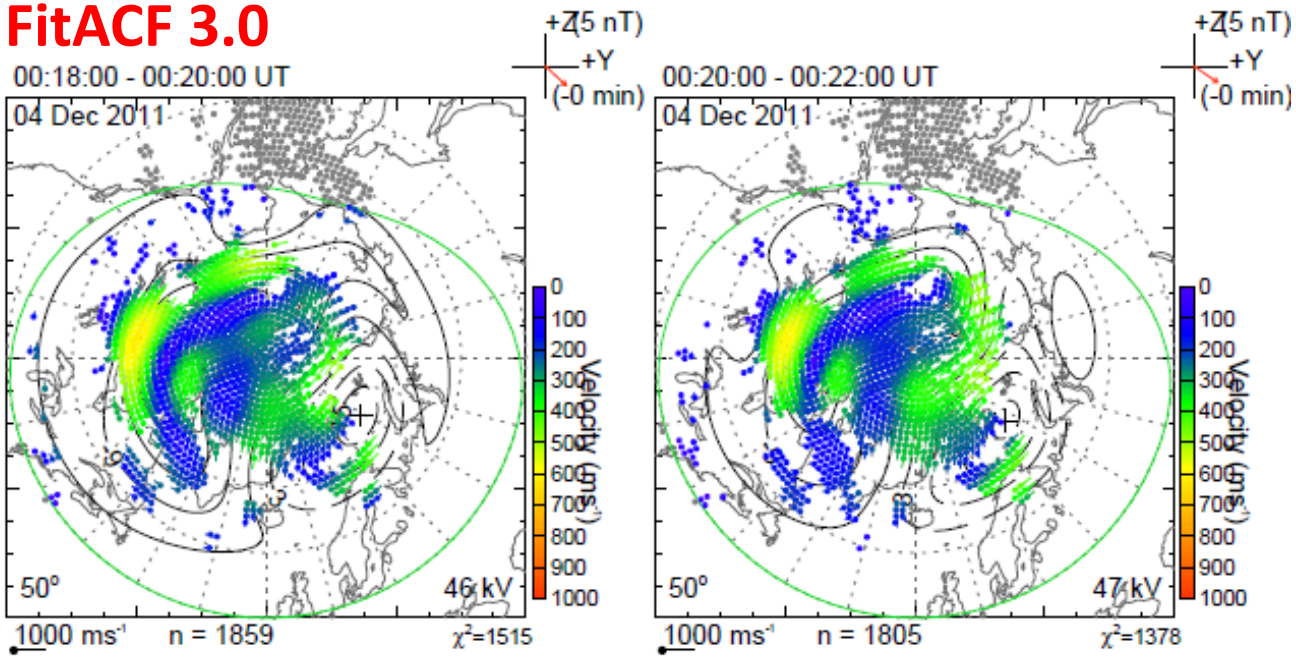
Number of LOS gridded vectors

Chi-squared statistic (chi_sqr)

FitACF 2.5



FitACF 3.0



Scatter / Vector availability

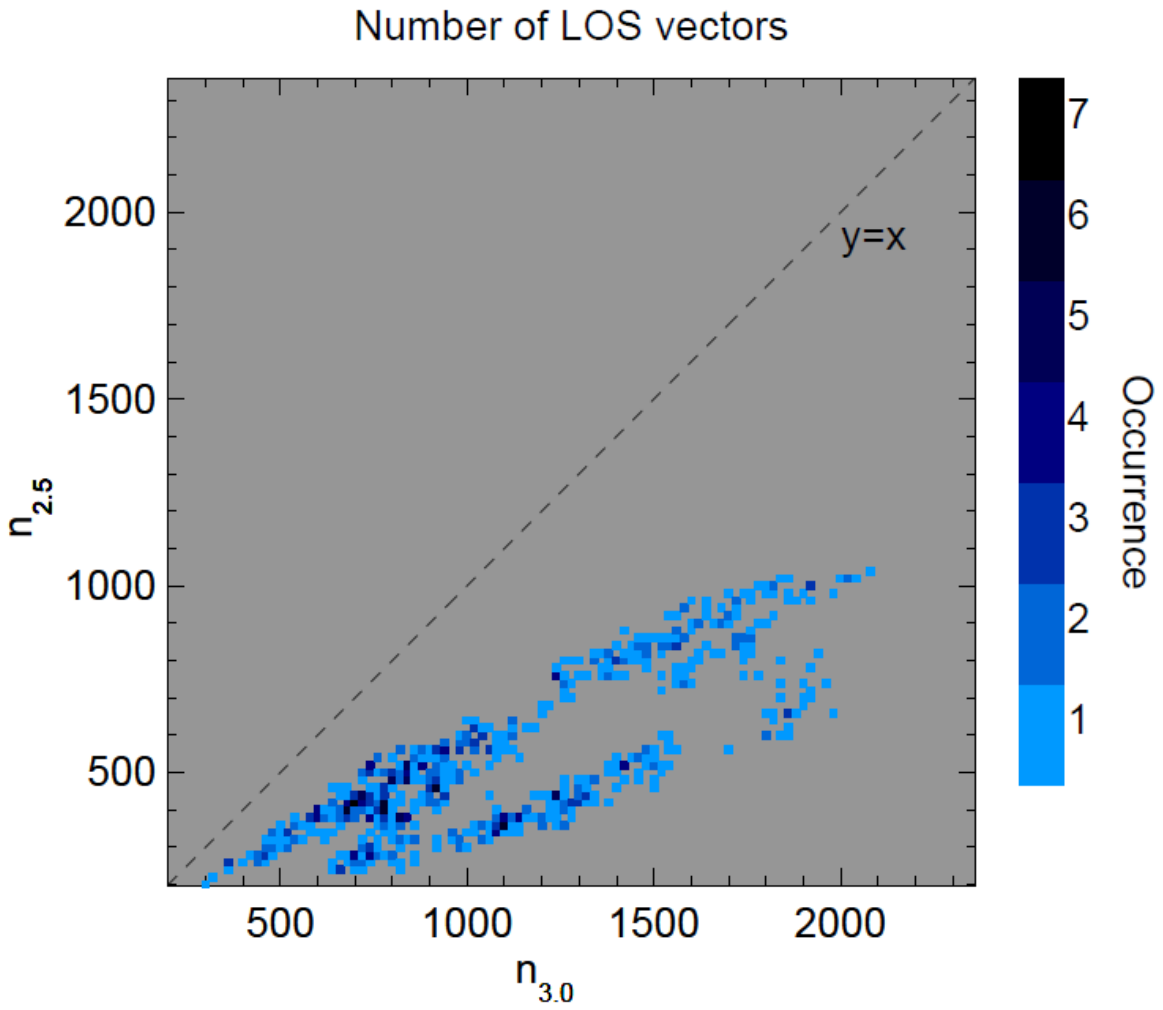
- Many more vectors at all latitude and MLT locations, when FitACF 3.0 is used
- At mid-latitudes, many low velocity vectors are observed with FitACF 3.0
- HMB is placed at much lower latitude due to increased vector coverage (this 50° position can continue unchanged for many hours)

Map parameters

In the following slides:

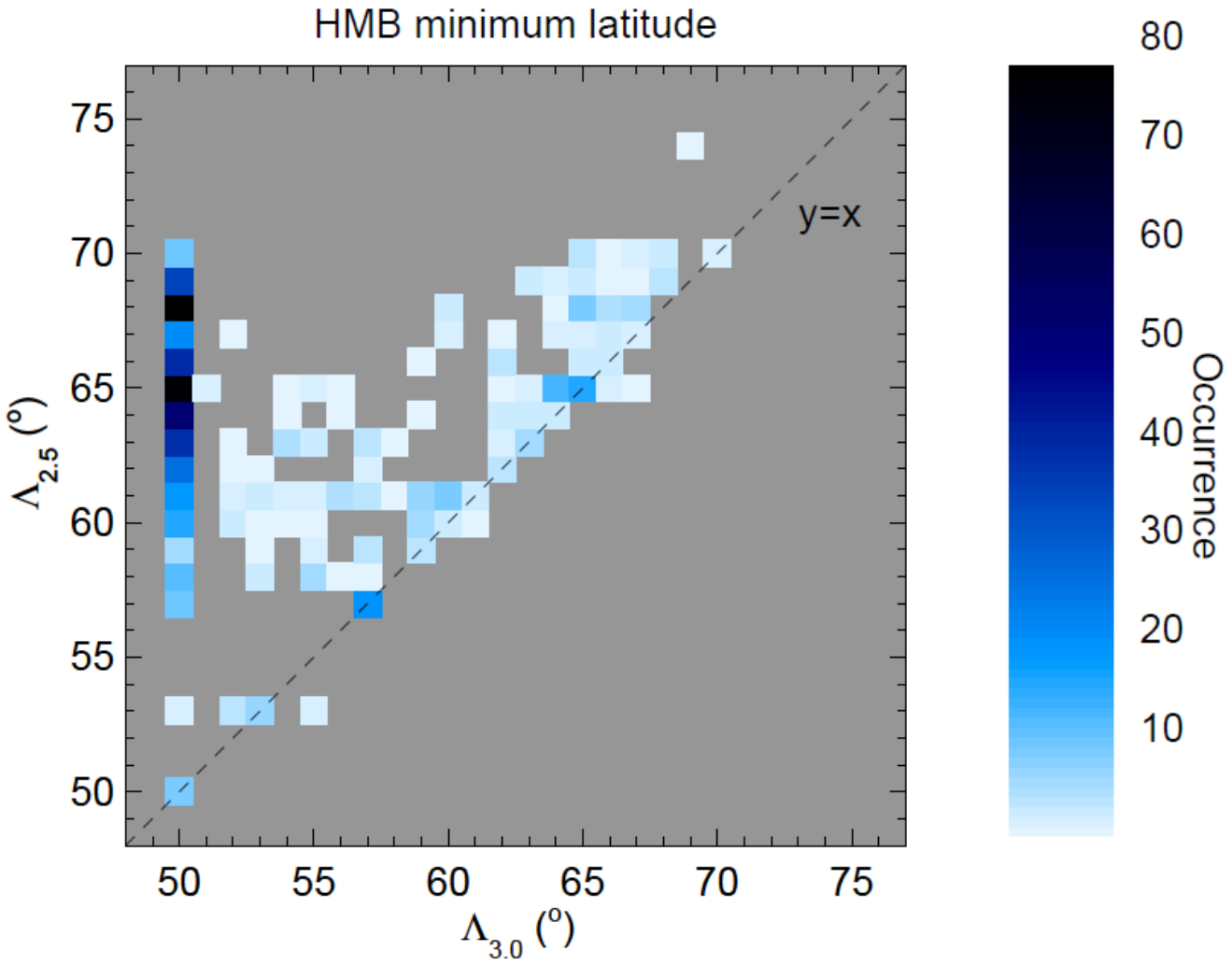
- Parameters extracted from .fit.map files are binned into 2D histograms (only bins with more than 0 counts are plotted)
- X-axis values are from maps created with FitACF 3.0
- Y-axis values are from maps created with FitACF 2.5
- Using all intervals from 20111204, created as described previously (720 points)

Number of LOS gridded vectors



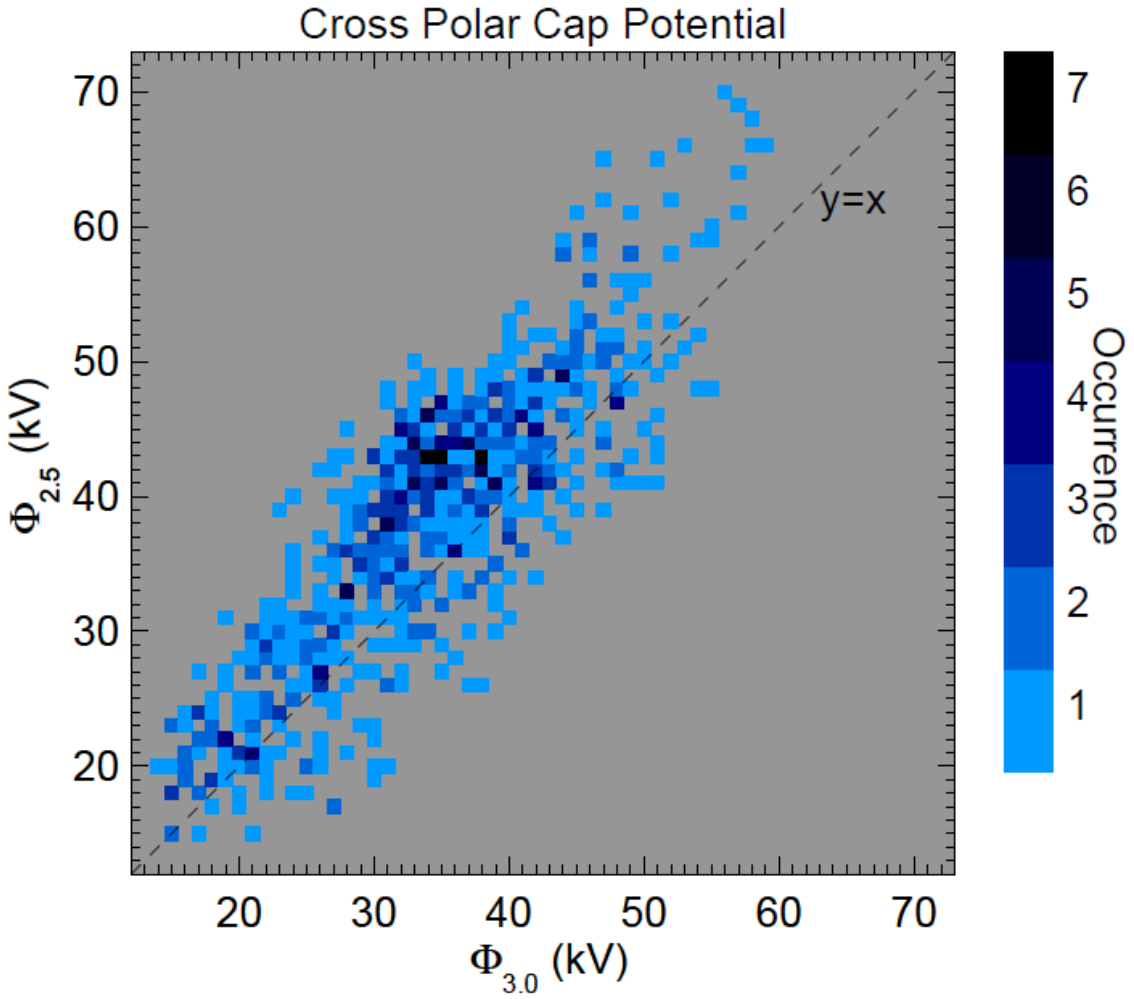
- All the data lies below the y=x line
- In all cases using FitACF 3.0 results in more gridded vectors than FitACF 2.5
- Appears to be two clusters, but hard to interpret this due to small sample size

HMB minimum latitude (at 0000 MLT)



- Vast majority of intervals have $\Lambda_{3.0}$ = 50° due to large increase in scatter, particularly at mid-latitudes
- 50° is the low latitude limit for the HMB in RST 4.2

Cross Polar Cap Potential



- Most of the data lies above the y=x line
- Higher CPCP from FitACF 2.5 than 3.0
- Lower CPCP from FitACF 3.0 due to lower HMB positions?

Conclusions

- Large increase in available LOS gridded vectors with FitACF 3.0
  - This means increased coverage of high latitude flows
  - Many extra low velocity vectors at mid-latitudes

- As a result the HMB latitude is often at its lowest latitude value, which is not representative of the expanding/contracting polar cap

- Cross polar cap potential is reduced slightly due to increase in size of convection region