

Discussion of CM SAF data using in the Czech Hydrometeorological Institute

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Introduction

- Czech Hydrometeorological Institute has serviced wide network of stations with high quality of meteorological elements measurements
- This network is quite dense but some areas of the Czech Republic is covered more scarce
- It is especially true for the solar radiation and cloudiness data
- Especially for these areas CM SAF can provide supplement to get more precise picture of local climate conditions

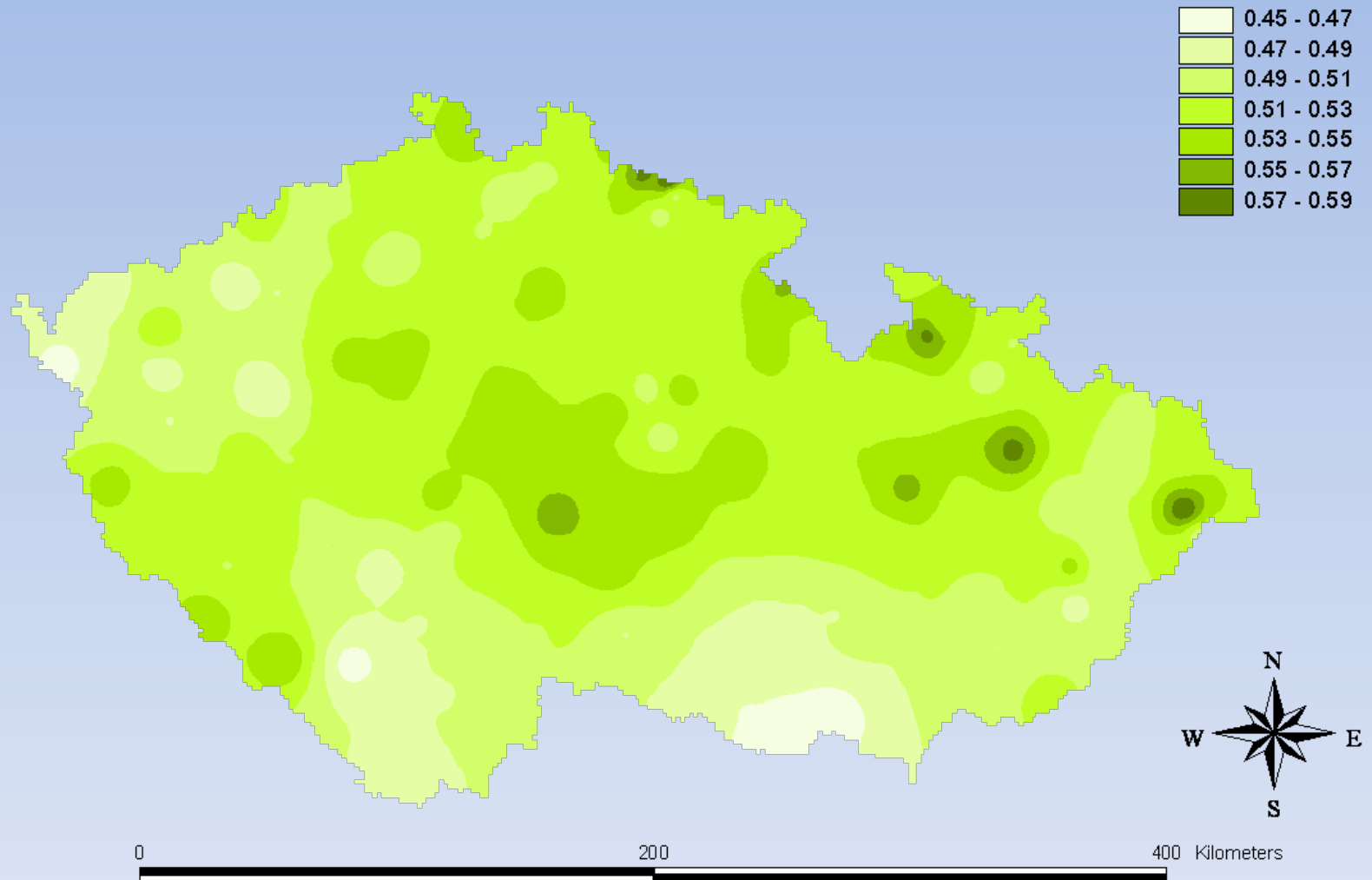
Introduction

- From this reason possibilities of using these data has been studied
- The attention was given partly to the comparison studies, partly to the some possibilities of their using – for solar radiation applications and cloud climatology
- Overview of these results/applications will be given and benefits compared to the traditional climatological data discussed

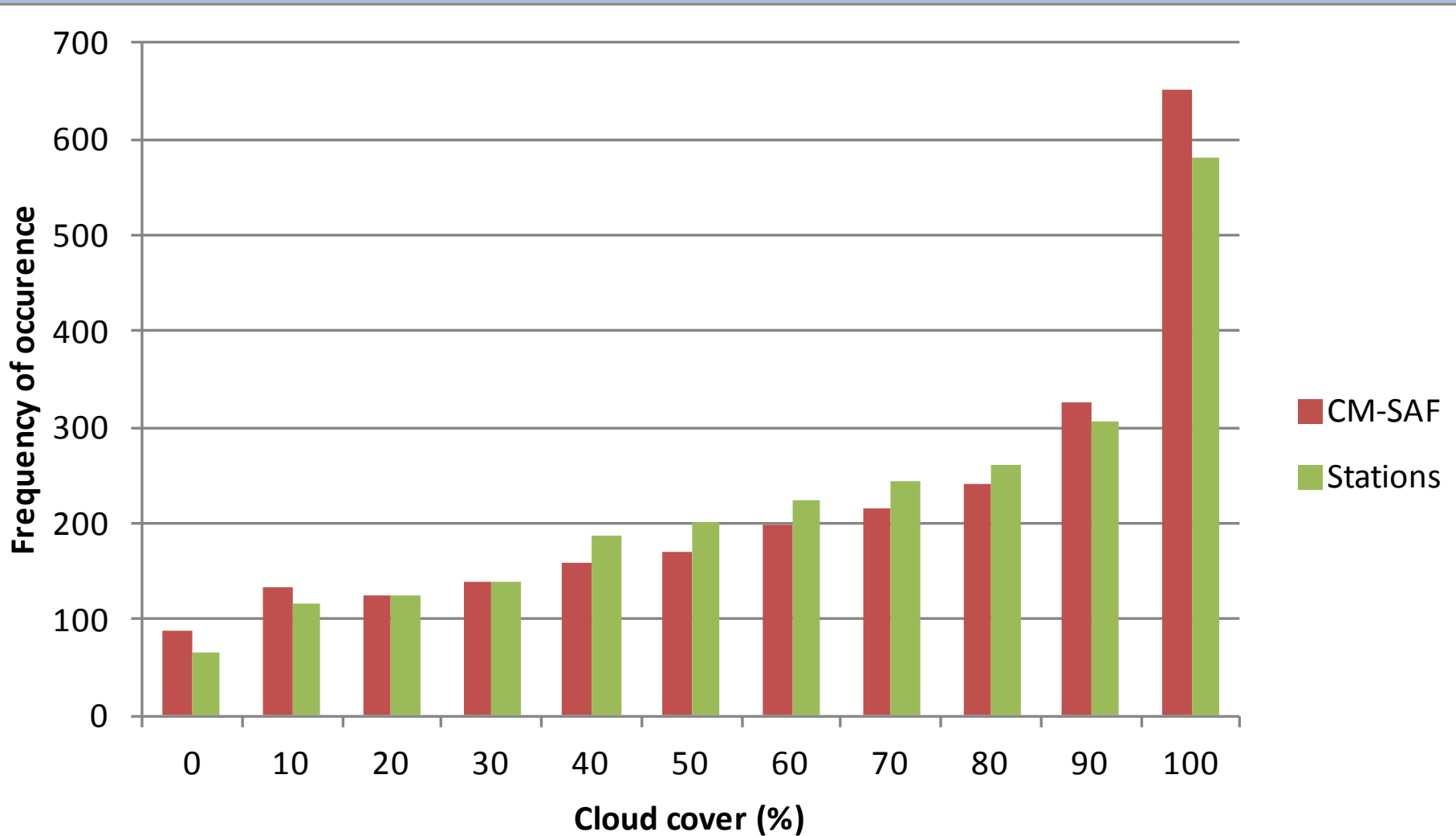
Cloud data

- Comparison studies
- CM SAF data used:
 - Cloud type (CTY)
 - Operational products
 - Period: 1st January 2006 – 30th June 2013 (approx. 2800 days)
 - Area of the Czech Republic
 - Fractional cloud cover (CFC)
 - Operational products
 - Period: 1st January 2006 – 31st December 2012 (approx. 2450 days)
 - Area of the Czech Republic
- Station data used:
 - SYNOP stations for CTY (approx. 37 stations)
 - Stations with climatological observations (approx. 120 stations)

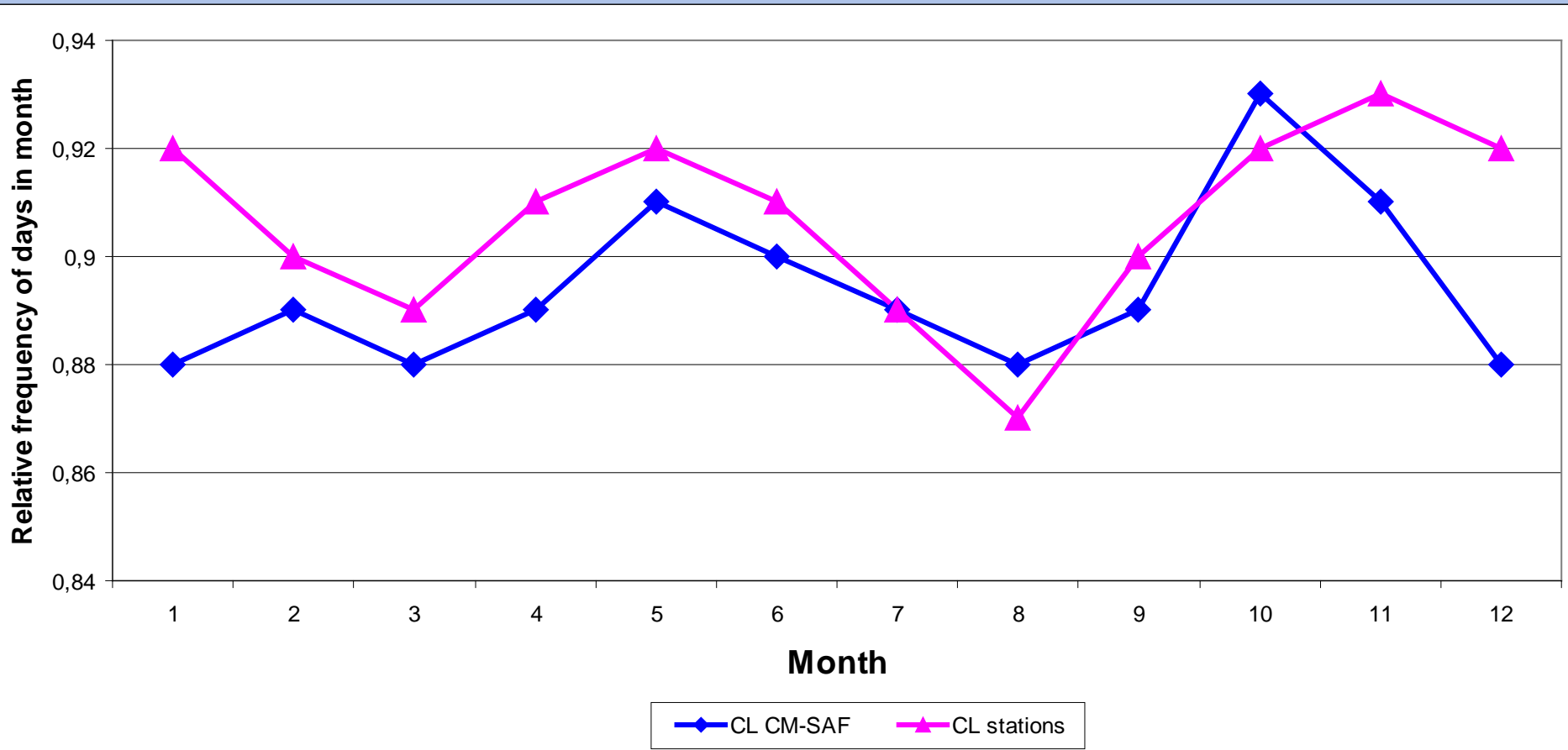
Annual average of Pearson's correlation coefficient for the Czech Republic territory



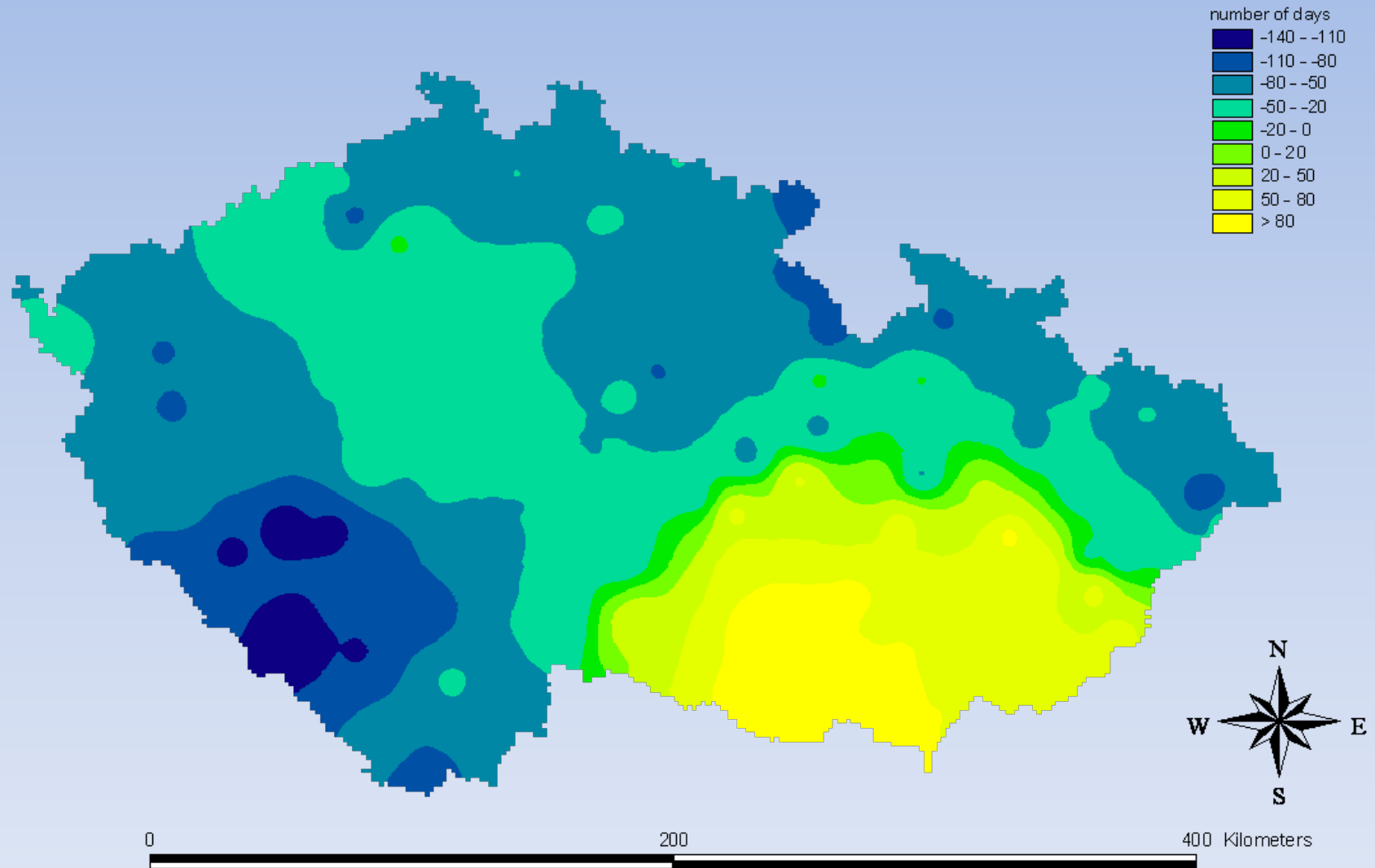
Frequency distribution of daily averages of CFC



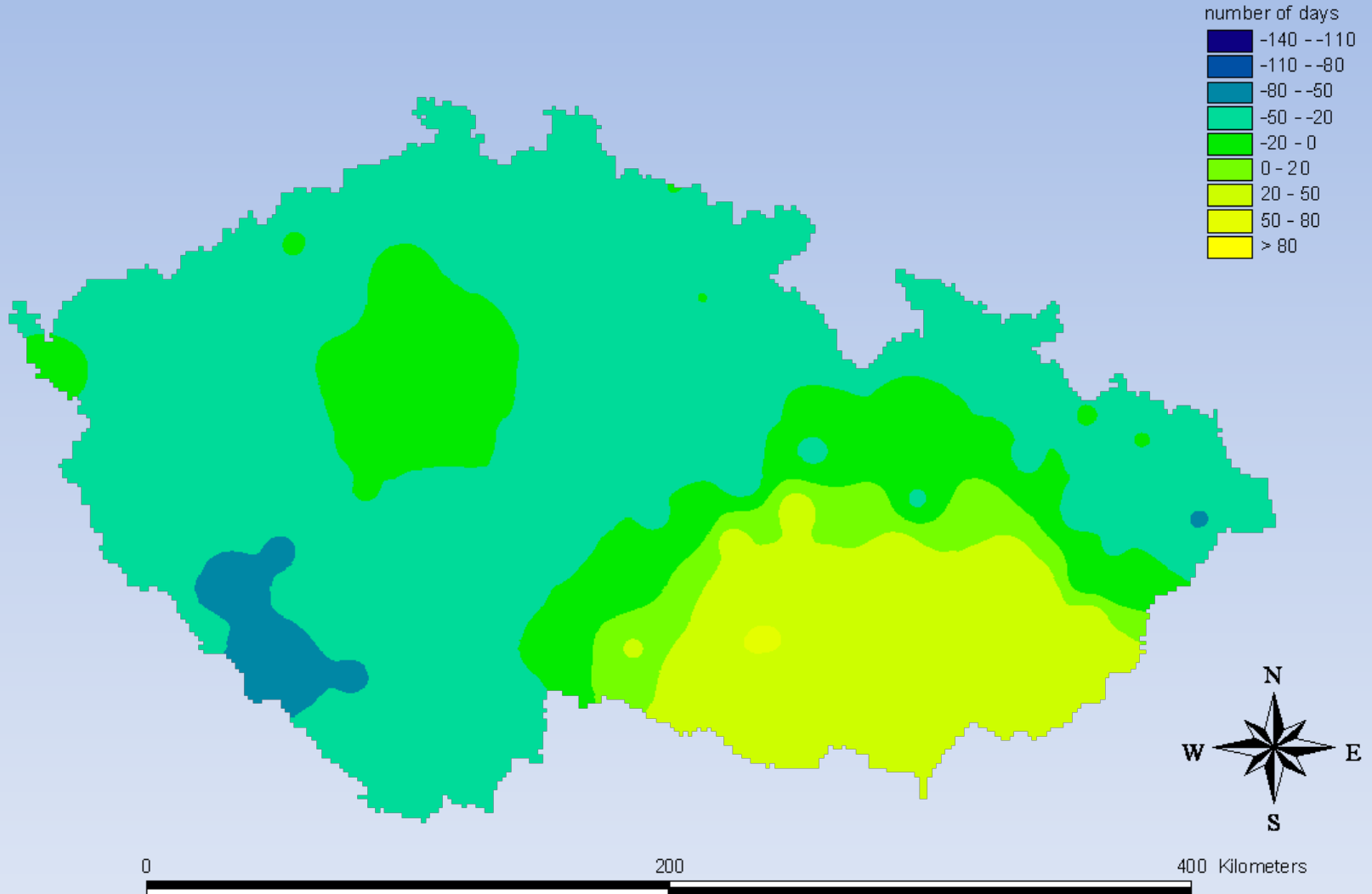
Annual course of CTY (for low level cloudiness)



Difference of overcast days (with CFC daily average over 80 %) between CM-SAF and cloudiness station observations



Difference of overcast days (with CFC daily average over 80 %) between CM-SAF and cloudiness station observations (cloudiness counted from sunshine duration)

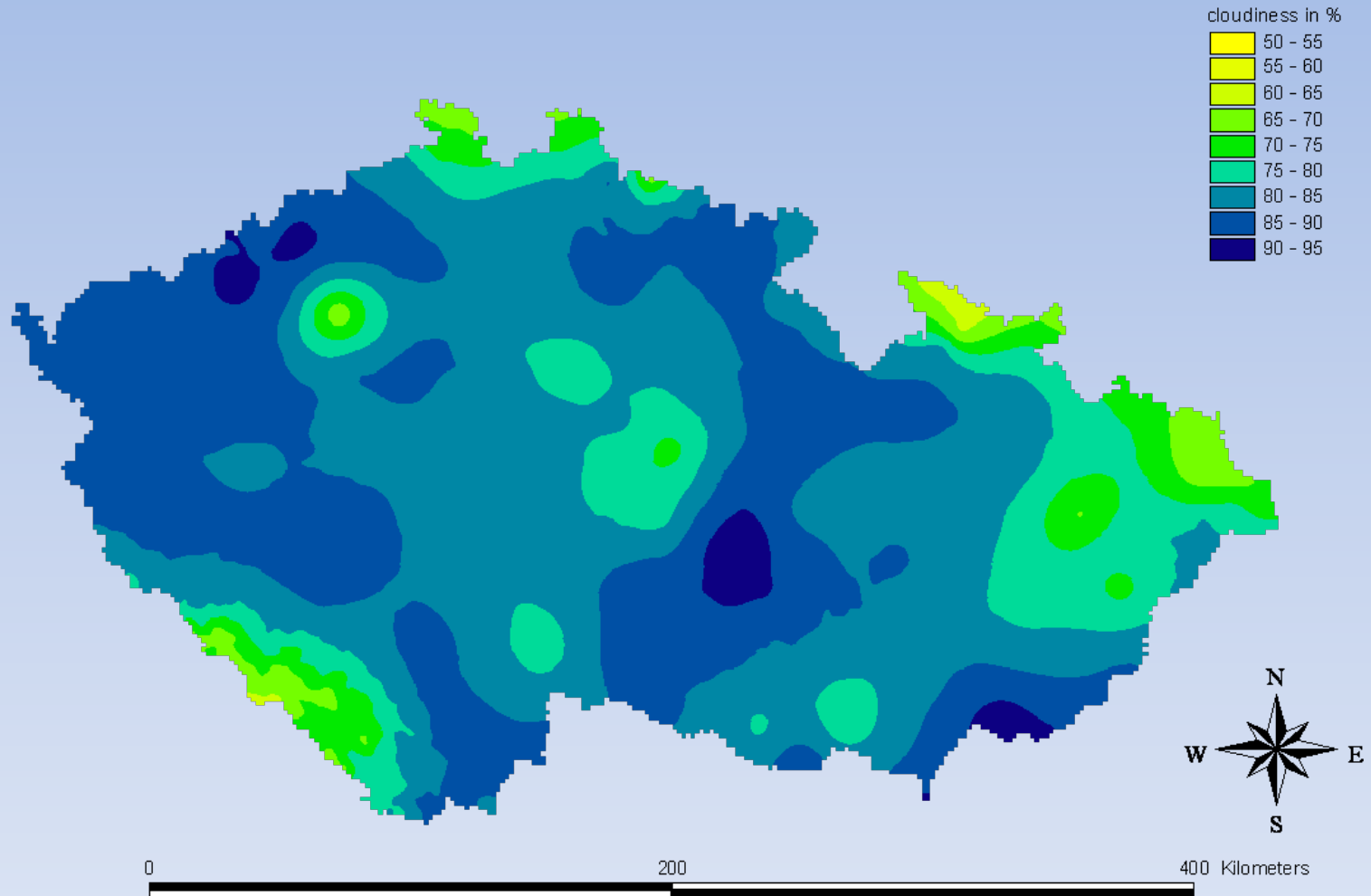


Maps with average cloudiness

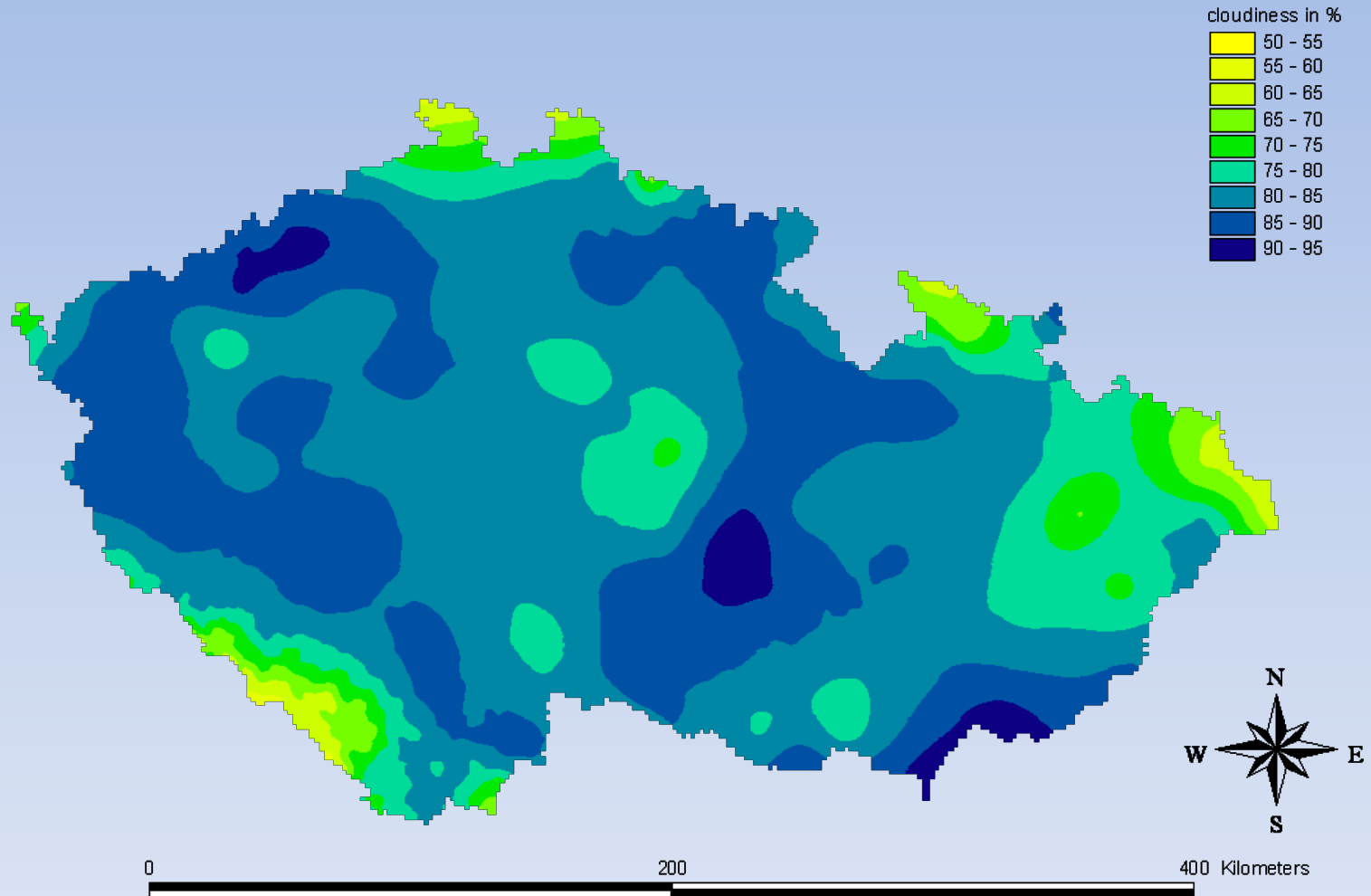
- Constructed by combination of surface station and satellite information
- Station cloudiness counted from sunshine duration data
- Data from CM-SAF used to create “fictive” points in regions with lack of surface stations
- On this network of more densely and regularly distributed data interpolation is done
- Results seem to be more realistic, at least from the expert point of view

Average monthly cloudiness for November 2012

(only station data based on sunshine duration)



Average monthly cloudiness for November 2012 (combination of station and CM-SAF data)

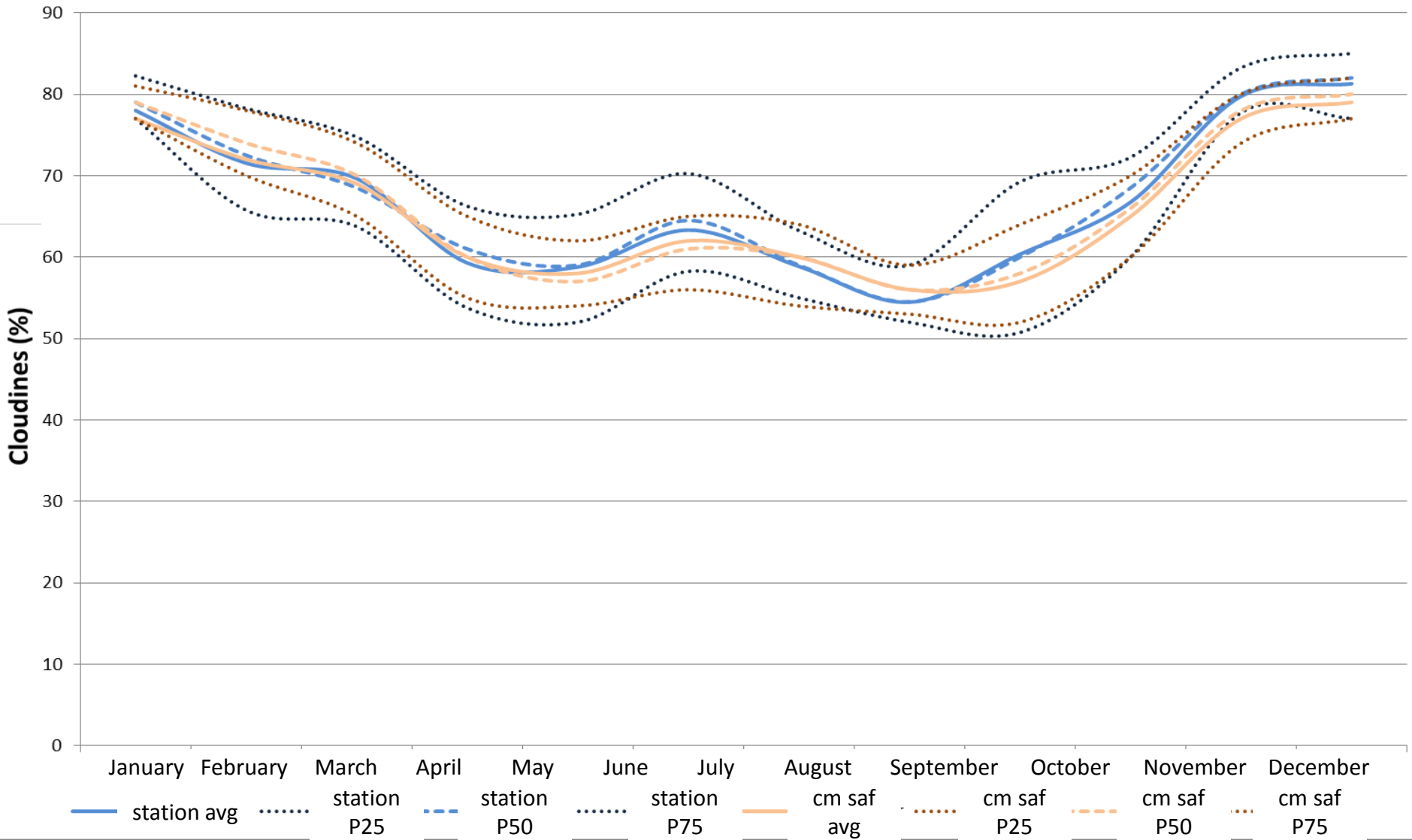


CFC „climatology“

- CFC data from 1982 to 2009 used to study cloudiness climatology *as seen from space*
- Better agreement between selected representative stations (correlation values 0.65 – 0.75) *compared to operational product*
- Similar statistical values of both types of datasets (*e.g. interquartile difference*)
- Annual course of CM SAF data very similar to station data
- Generally, better agreement for stations situated in more „simply topografy“

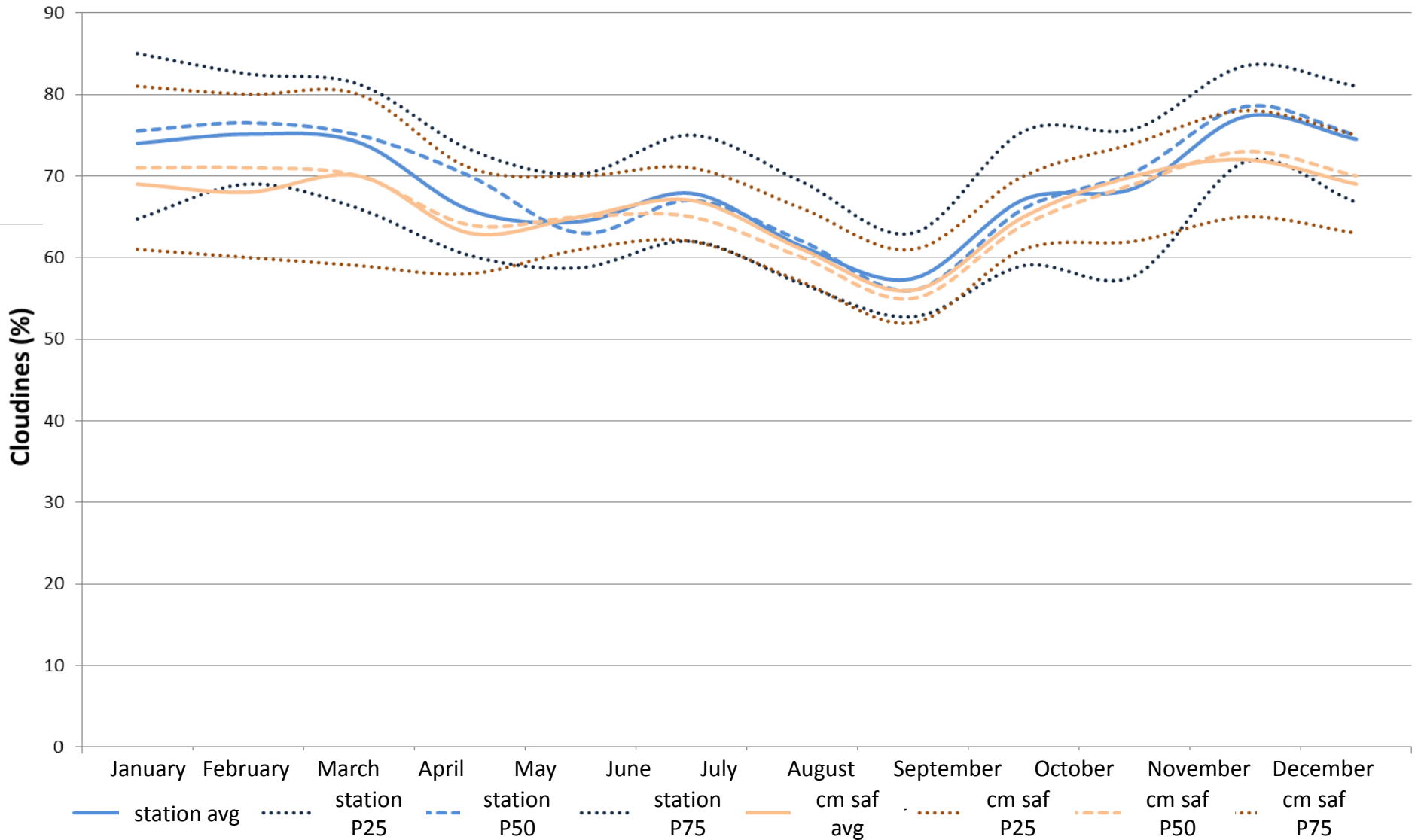
Annual course of CFC for selected location

Doksany (1982-2009)



Annual course of CFC for selected location

Lysá hora (1982-2009)



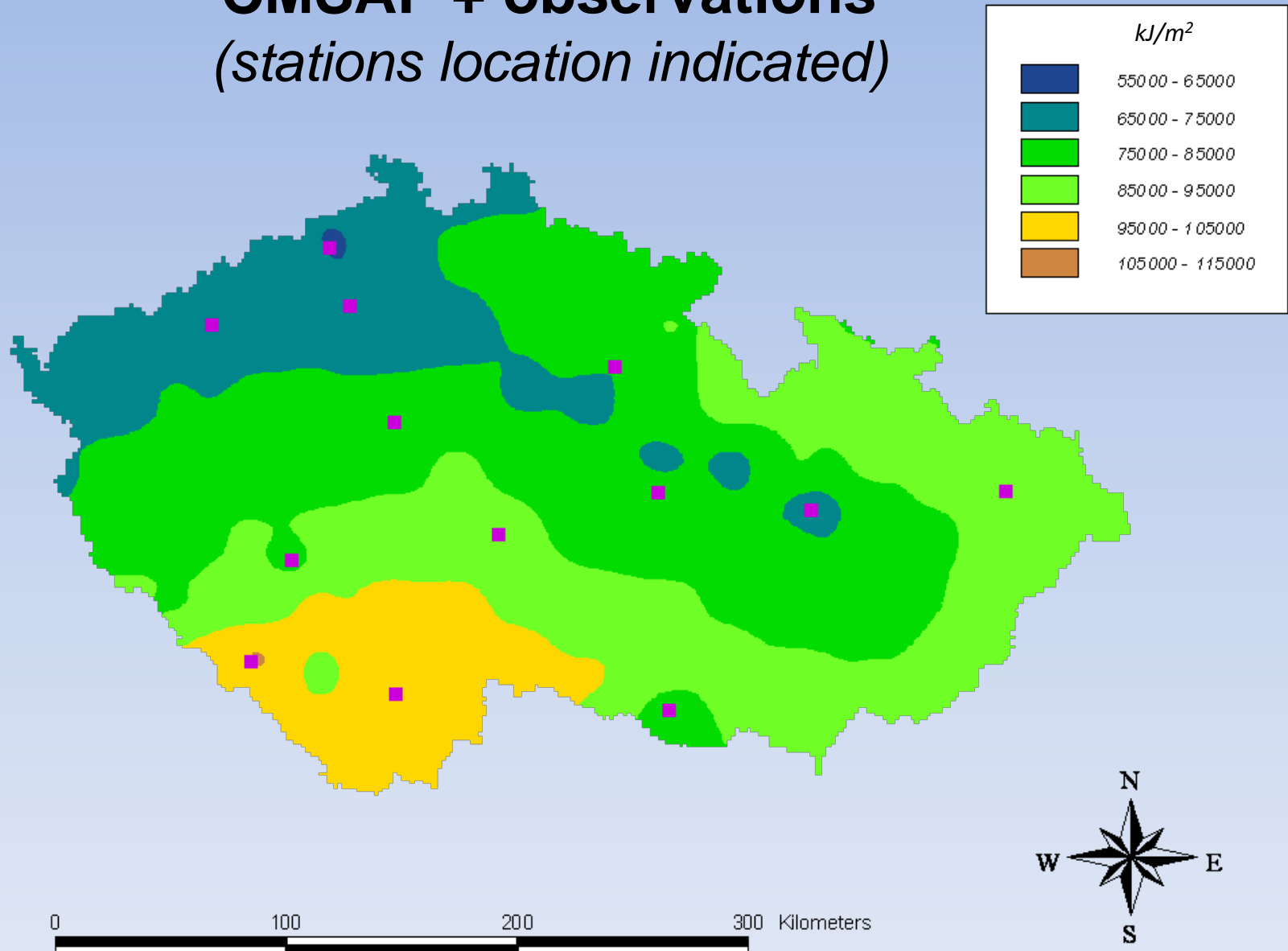
Global radiation data

- Our customers usually request monthly sums of global radiation (measured only at 14 stations in the Czech Republic)
- Maps of monthly sums of global radiation based on SIS data from CM SAF were offered in 2013 (*based on operational product, i.e. with delayed delivery compared to the station data*)
- Maps were constructed by merging CM SAF SIS data and surface station

Global radiation for December 2013

CMSAF + observations

(stations location indicated)



Lectures on Faculty of Mathematics and Physics at Dept. of Meteorology and Env. Protection

- Within the frame of *Applied climatology* courses
- Introducing of CM SAF data and their possibilities is given
- Students learn to familiarize with CM SAF web page including procedure of data ordering
- Students try to work with any product and/or dataset and may to analyse it
- One Mgr. thesis on CM SAF cloudiness written (by P. Sacha)



Final remarks

- The CM SAF data definitely provide benefits for some parts of Dept. Of General Climatology (CHMI) activities
- Especially for regions and/or times with less dense data
- The problems that have been arising are more „philosophic“ – different ways of observations from surface and space
- The situation is more „straightforward and easy“ for radiation data compared to cloudiness data

Future plans

- Continuation with cloud and radiation climatology for the Czech Republic
- Cooperation with colleagues from Dept. Of Met. and Evn. Protection at FMF CUNI (using of selected CM SAF data for validation of RegCM)
- Take a look at humidity parameters
- Provide more information about CM SAF data to colleagues in CHMI
- ...