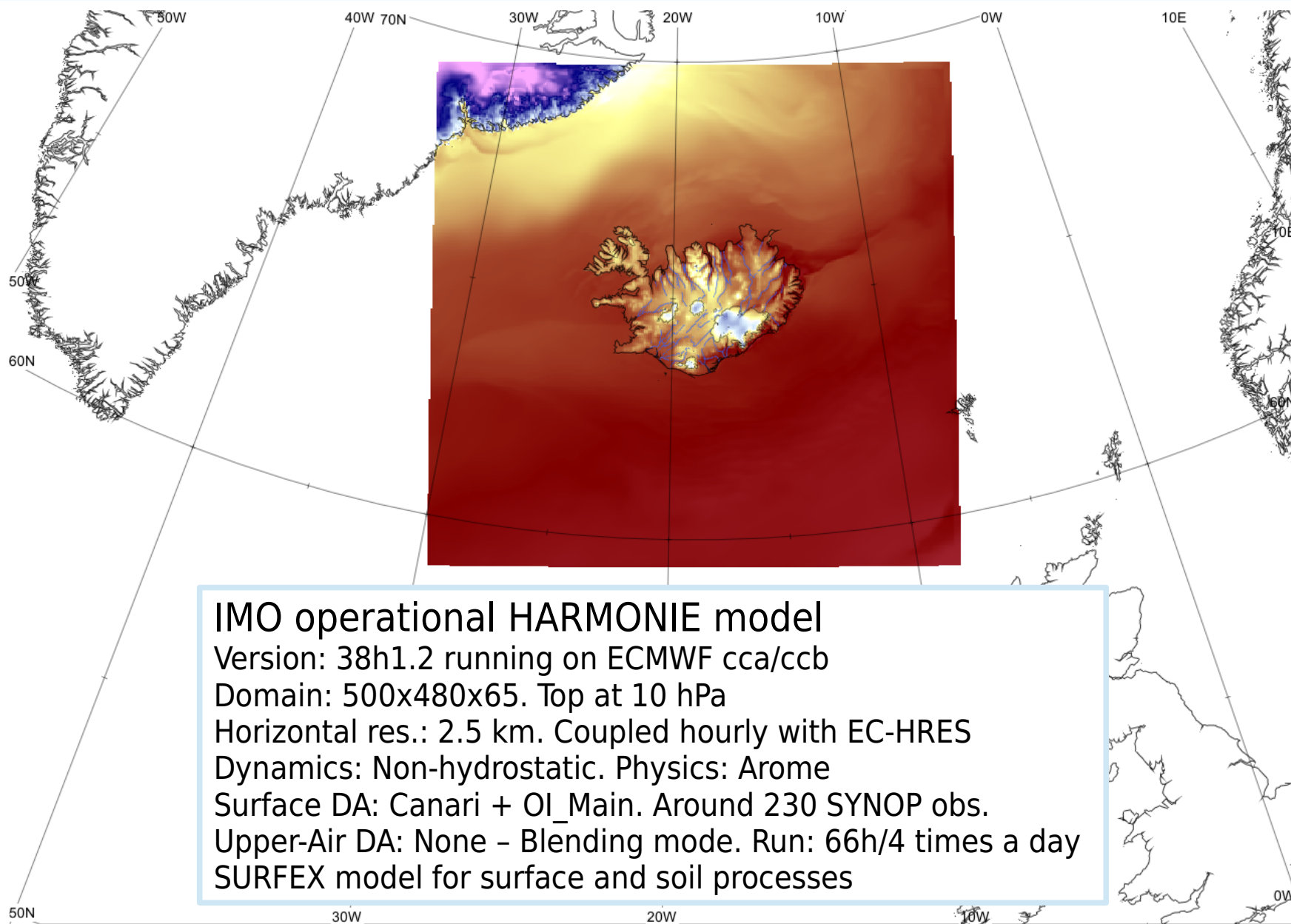

Upgraded PGD over Iceland

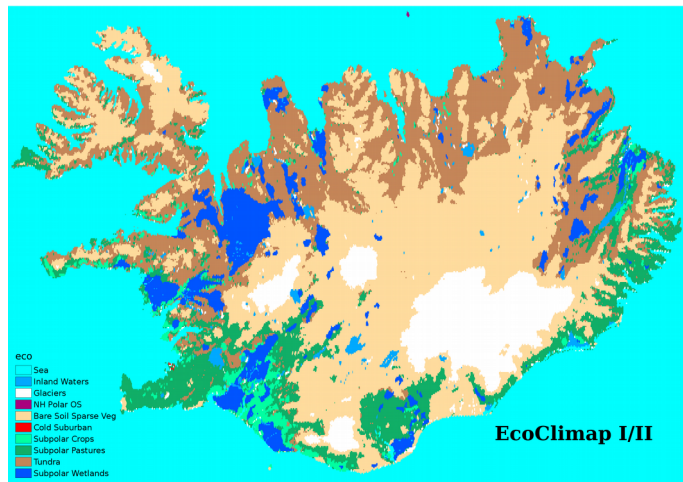
**NMM31 in Reykjavik
June 18 2018**

Bolli Pálmason

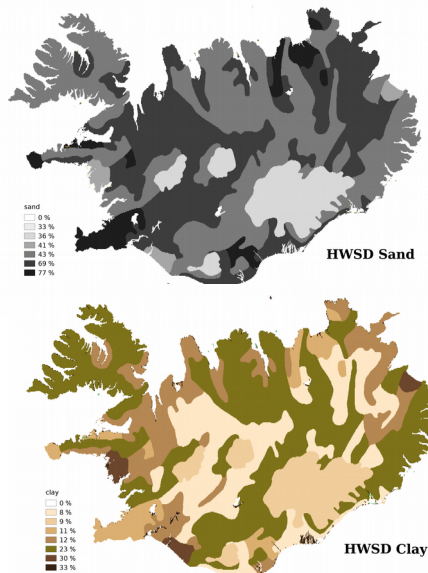
HARMONIE-AROME 2015-18 setup for Iceland



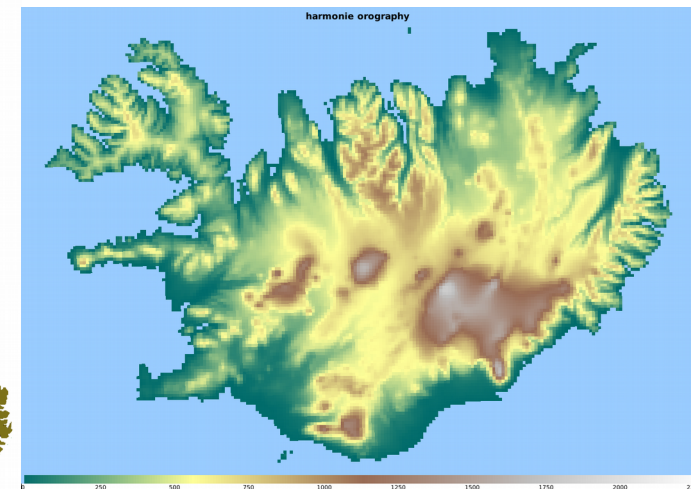
ECOCLIMAP-I/II



FAO HWSD



GTOPO30 1 km



- The databases used to setup the initial physiography of the model domain
- Sea, lakes, glaciers, vegetation etc. is provided by the ECOCLIMAP databases, but also albedo, leaf area index, soil depths and more.
 - The soil compositions (sand/clay) is provided by the HWSD database
 - The orography comes from the GTOPO30 and later GMTED2010 databases

All three databases have now been update for Iceland!

ECOCLIMAP : A global database of surface parameters

A land cover map at 1 km resolution in latlon projection
Fully coupled to SURFEX, or available separately)

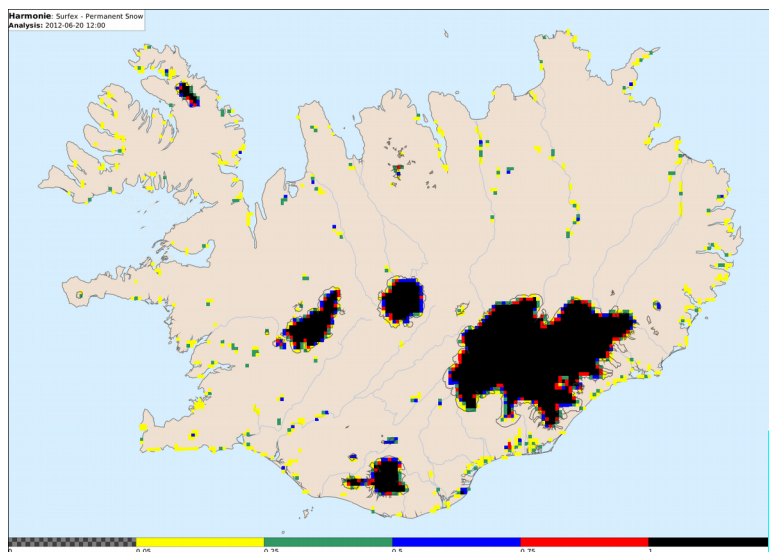
ECOCLIMAP I : global (215 covers)

ECOCLIMAP II Europe (273 covers)

10-day period surface parameters: LAI, fraction of vegetation veg, roughness length, emissivity, fraction of greenness.

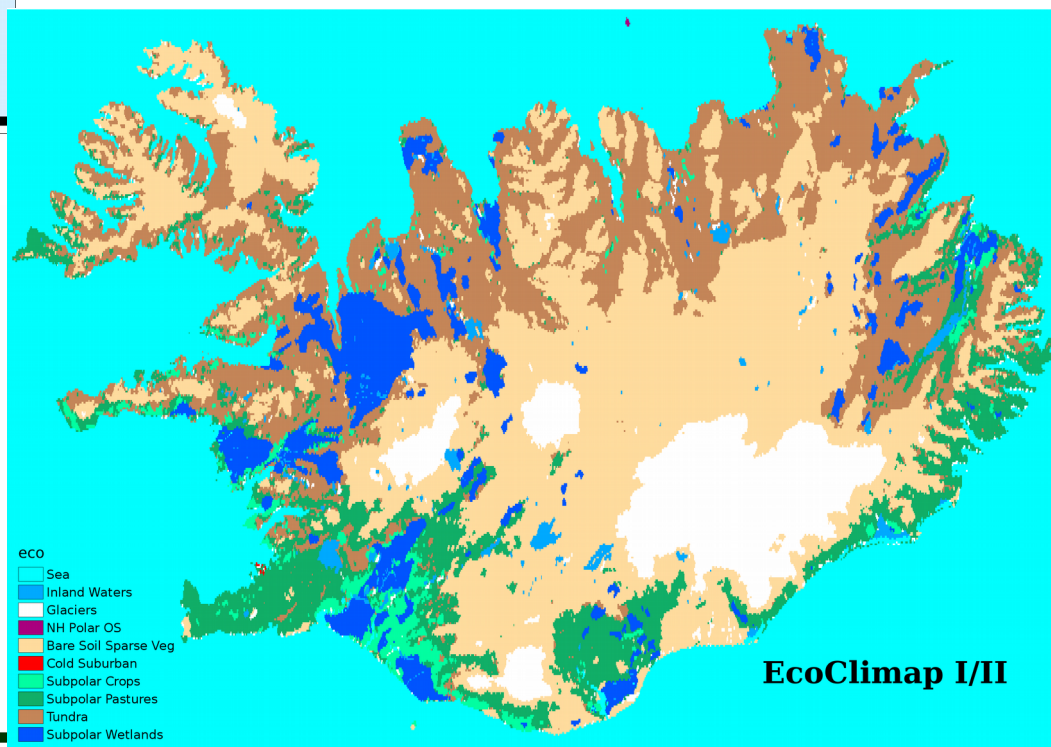
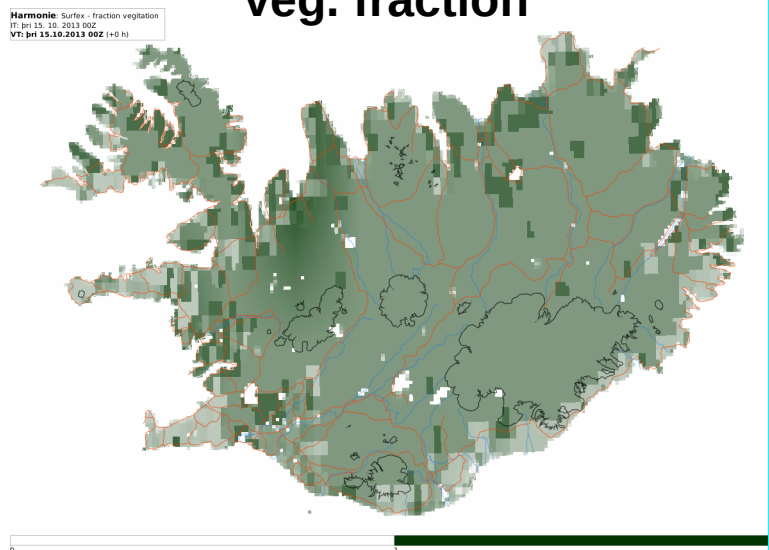
Constant surface parameters: visible / nir / uv albedos, minimum stomatal resistance...

Permanent snow / Glaciers



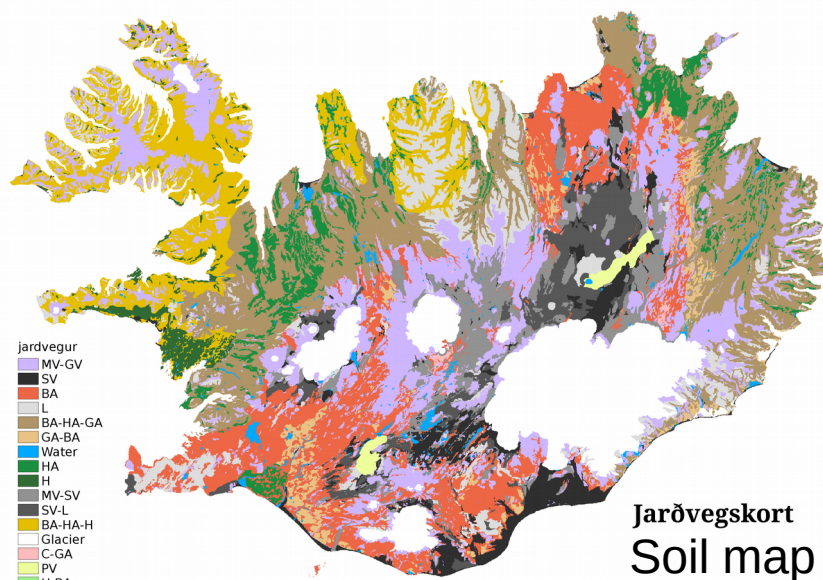
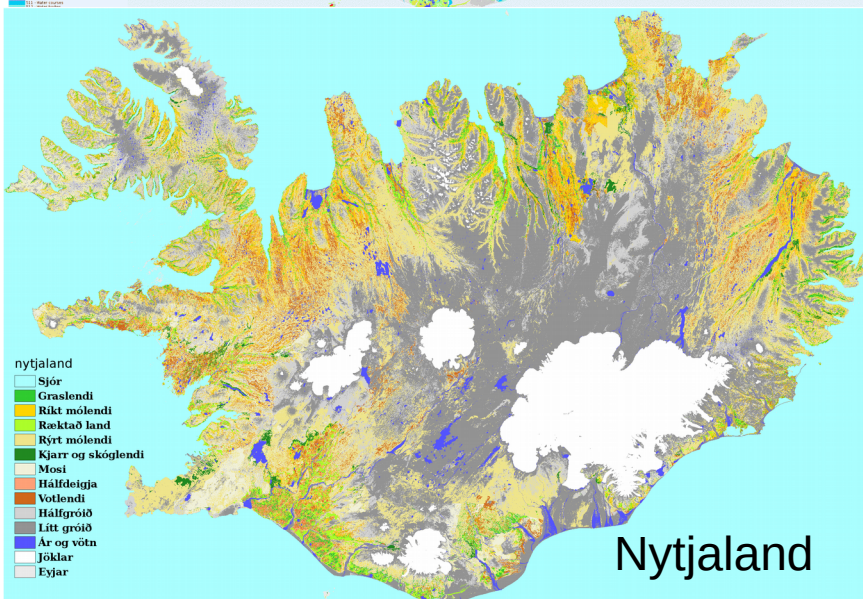
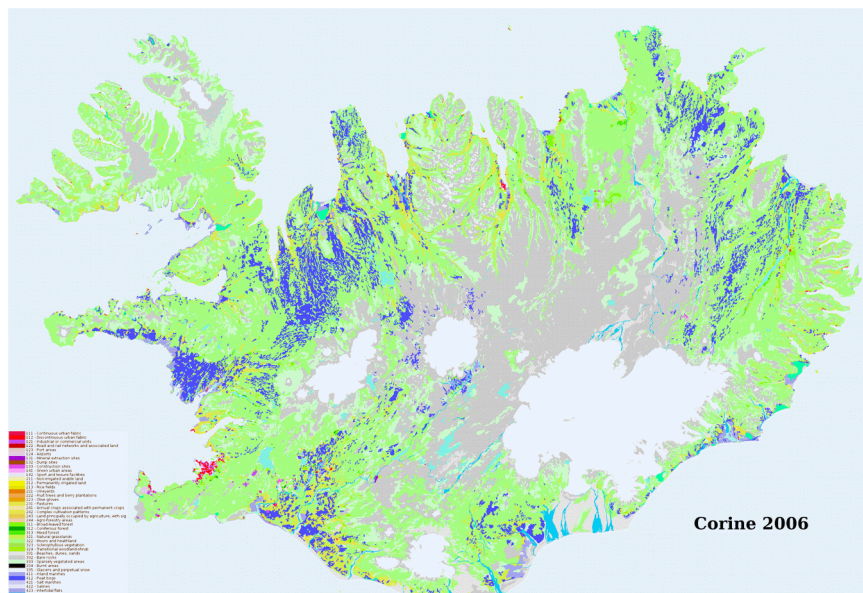
- ECOCLIMAP-I and II identical for Iceland
- A lot of errors:
 - Glaciers - extents and locations
 - Lakes - often in wrong locations
 - Vegetation - type and coverage
 - And more...

Veg. fraction



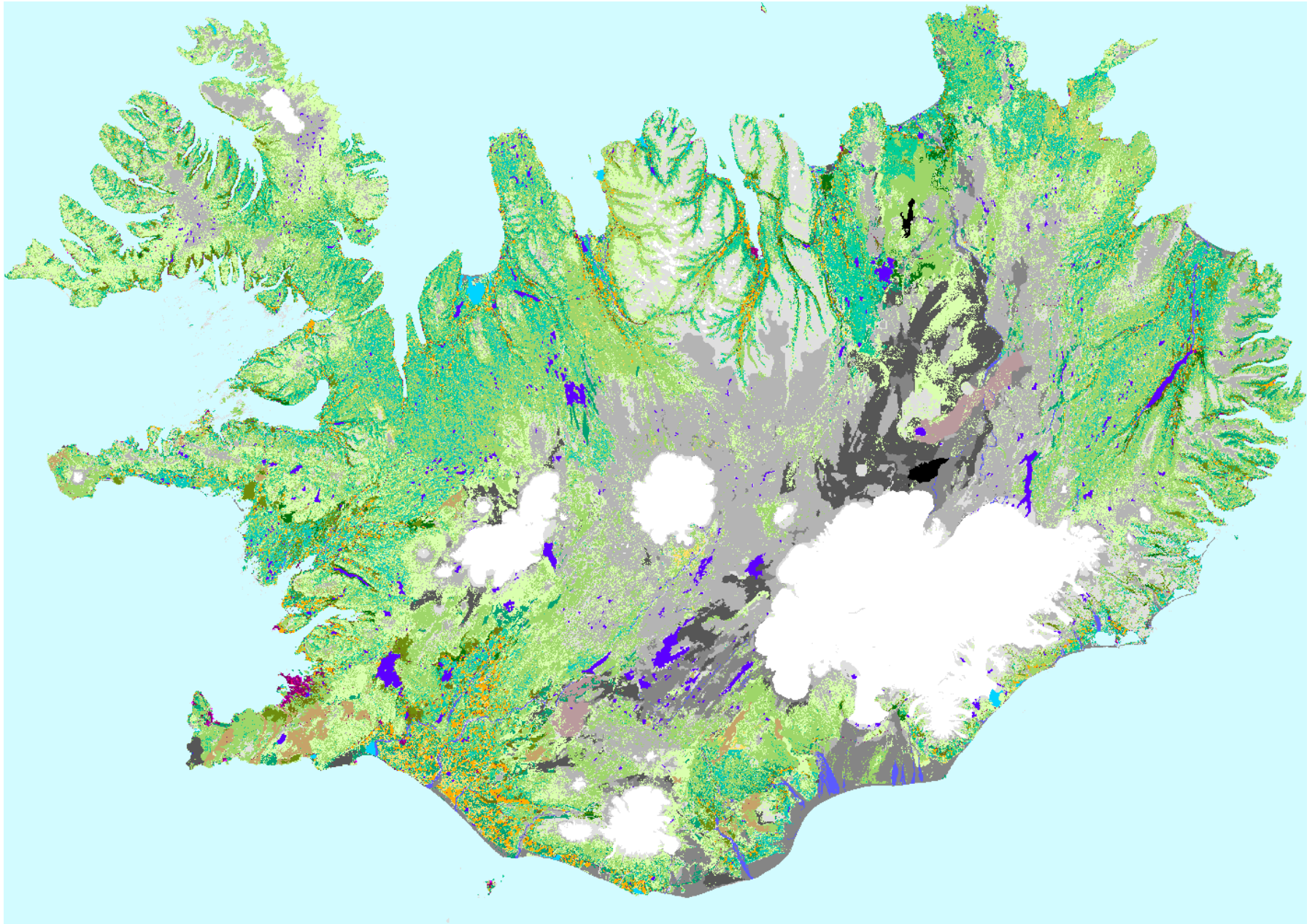
EcoClimap I/II

New PGD: Corine and AUI maps used



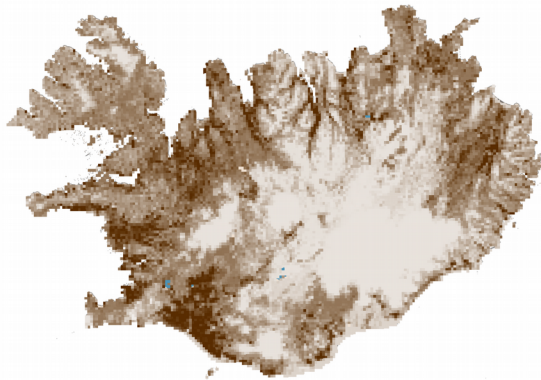
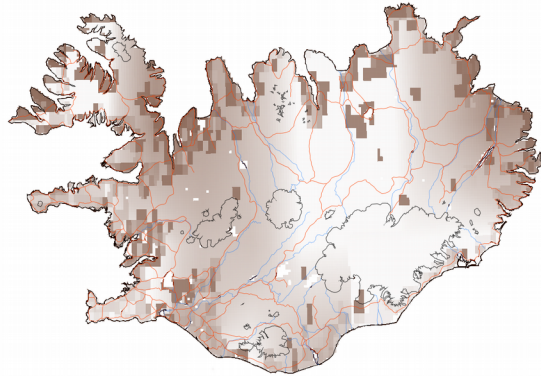
- Three databases joined into new EcoClimap-II for Iceland
- Corine 2006/2012
- AUI Soil map used for non-veg. areas
- Finally all vegetation over-written with the best veg. map from AUI.
- AUI → Agricultural Uni. of Iceland

New EcoClimap-II binary map for Iceland

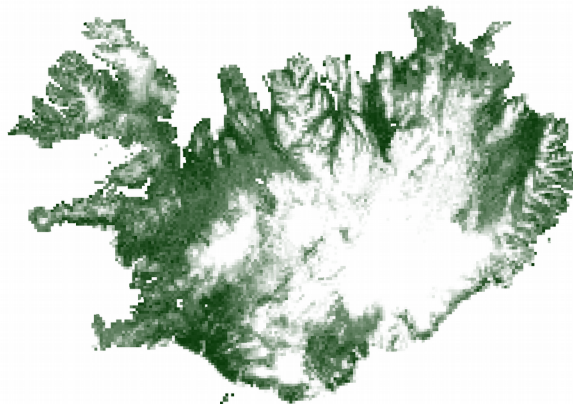
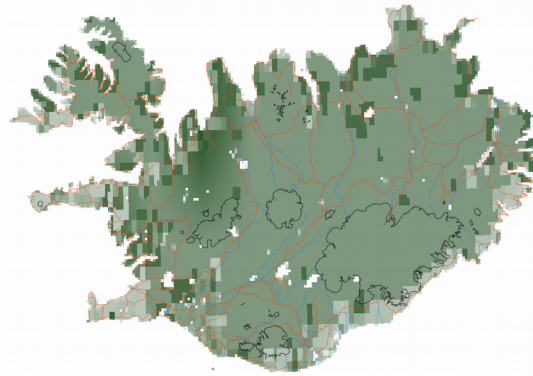


Comparison old -> new

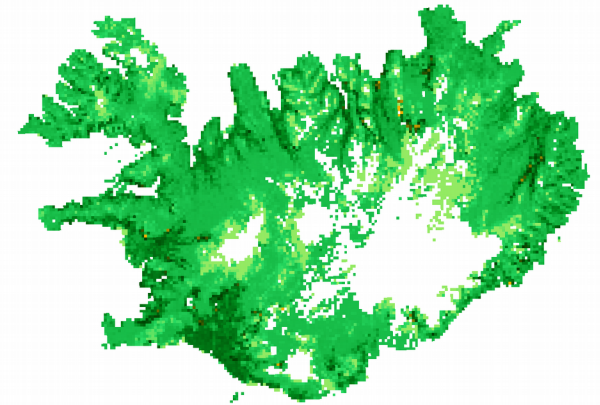
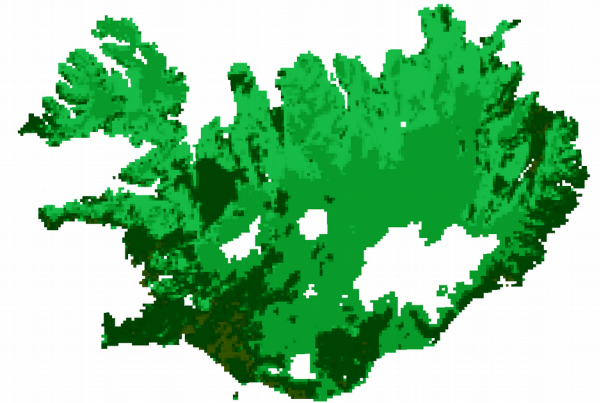
Soildepth



Veg. Fr.

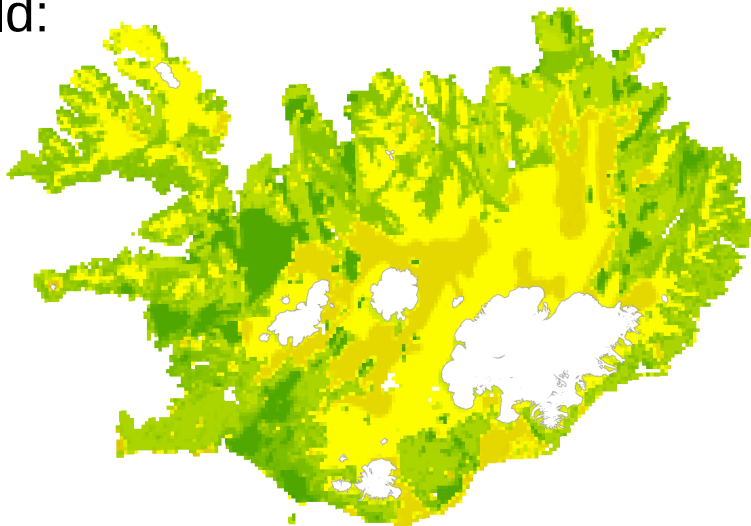


LAI



Albedo NIR old -> new vs MODIS

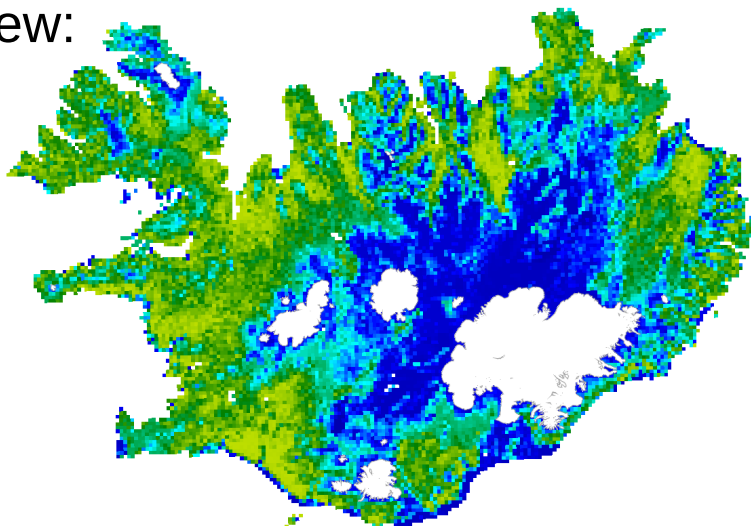
old:



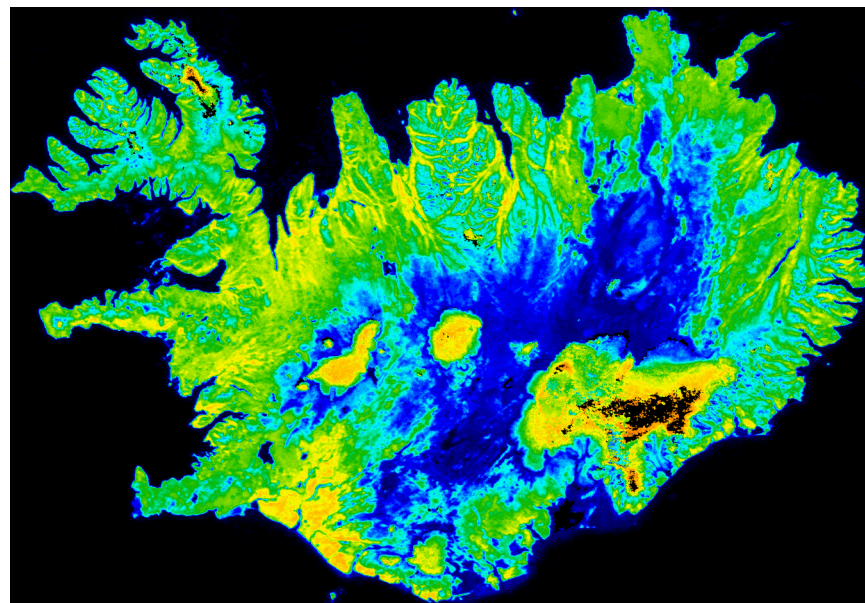
MODIS products used to update LAI and albedo by compiling multi-year mean maps every 8 or 16 days and with interp. we get the 36 10-day values needed by ECOCLIMAP-II

NIR albedo in July

new:



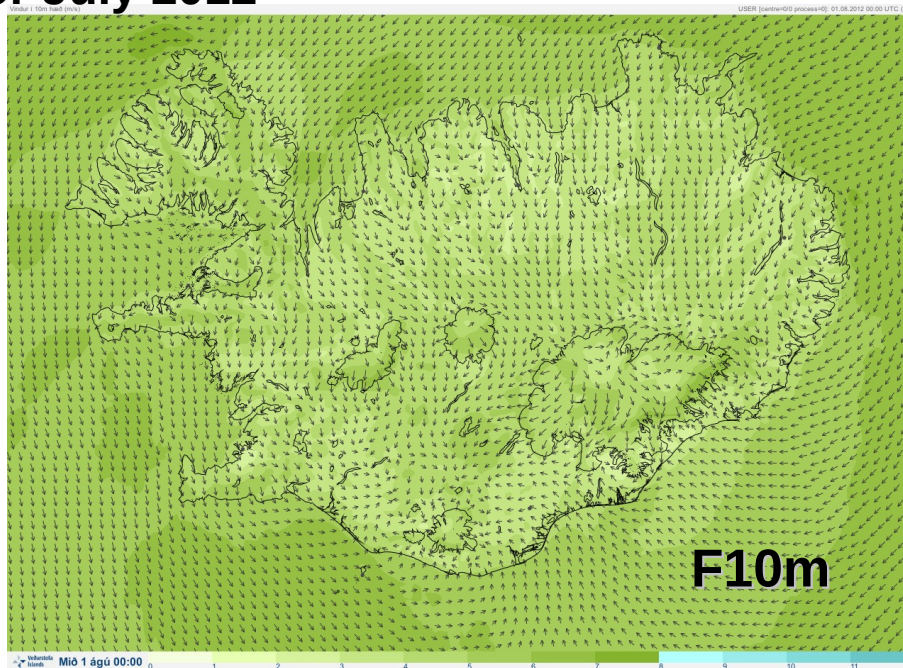
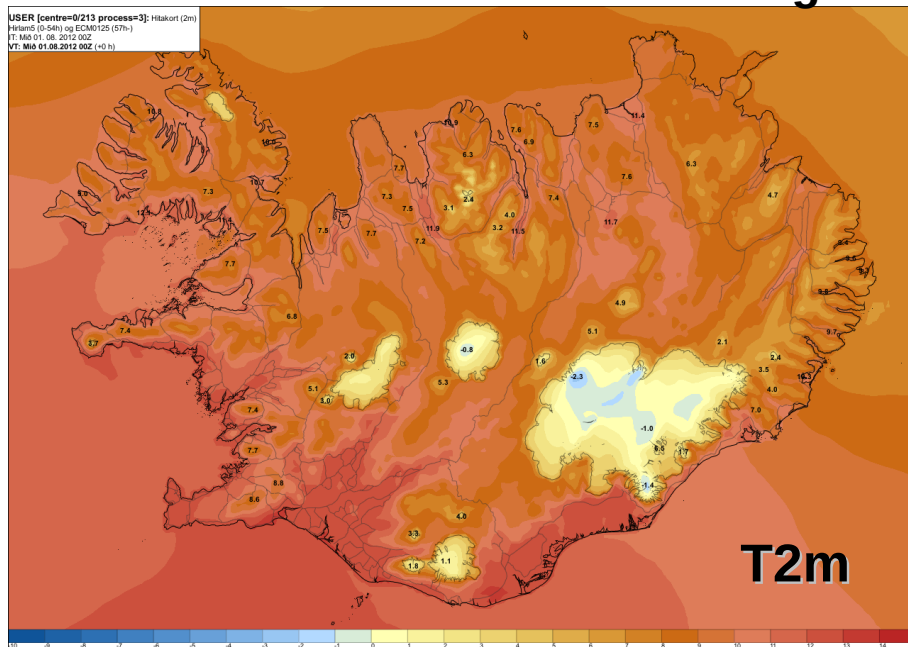
MODIS multi-year mean



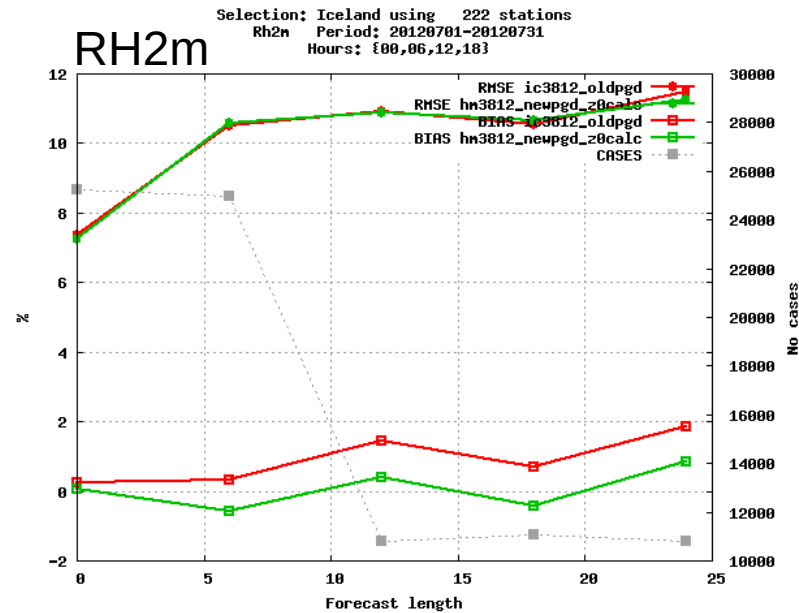
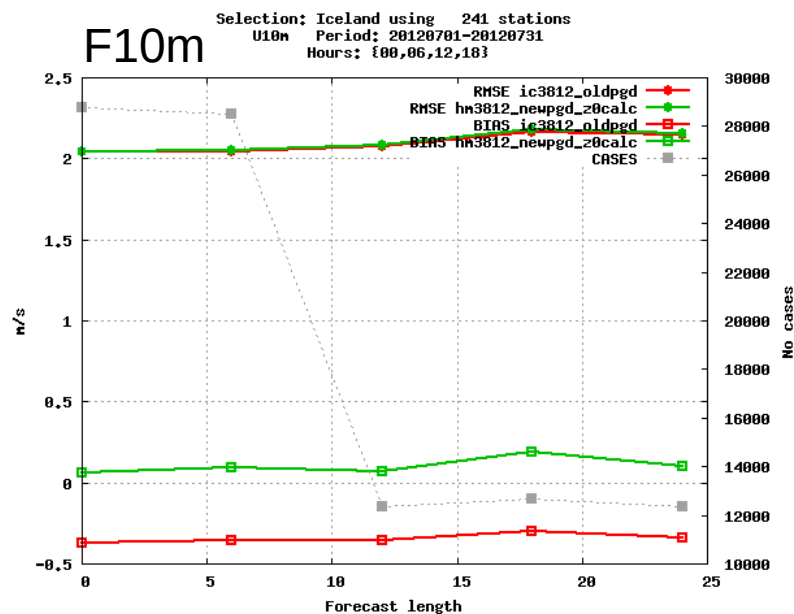
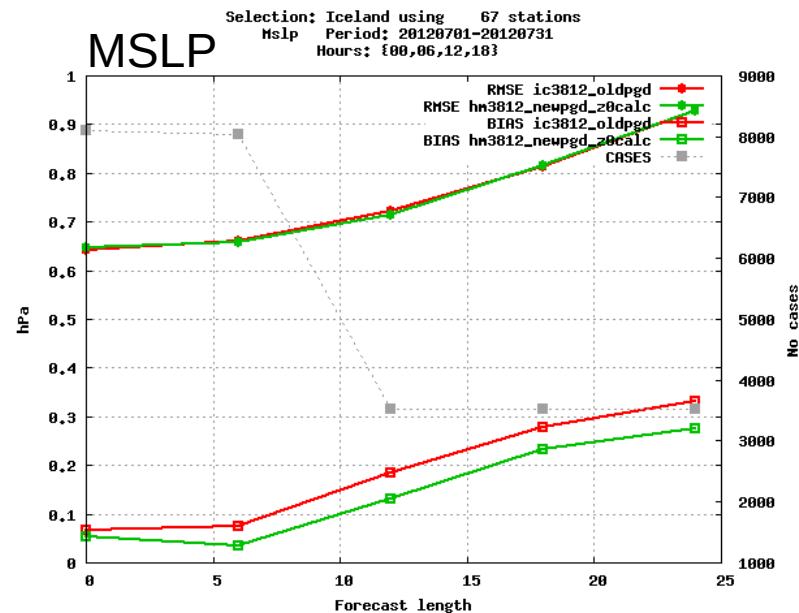
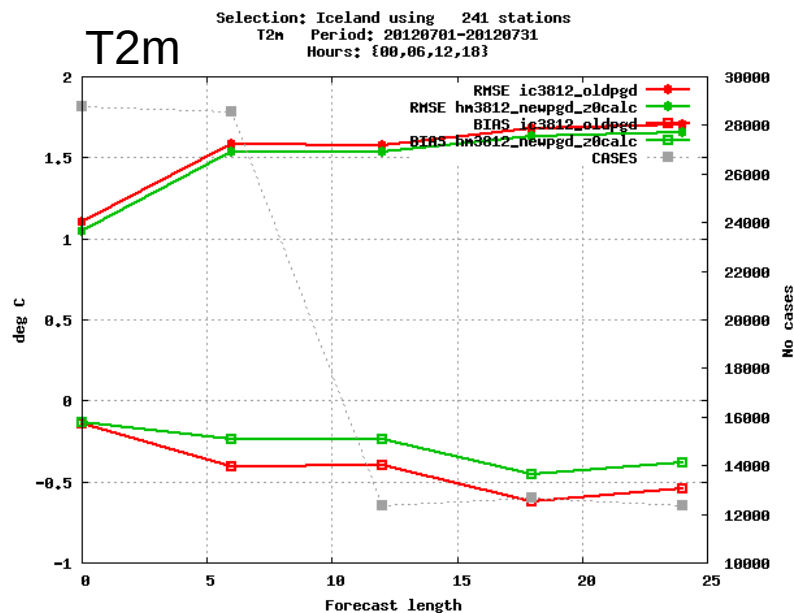
Comparison runs for 2012

- HARMONIE-AROME cy38h1.2
- New PGD vs. old PGD databases
- New PGD with SSO turned off but old PGD with SSO
- 6h forecasts at 06/18Z and 24h at 00/12Z
- Verifications scores RMSE and ME (bias)
- Maps with differences in monthly means
- Three months verified: July, September og November 2012
- Biggest impact in July as would be expected

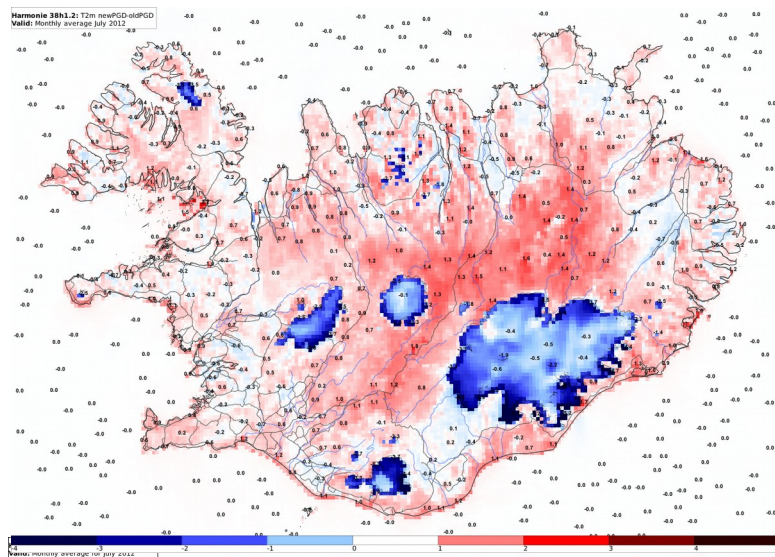
Averages for July 2012



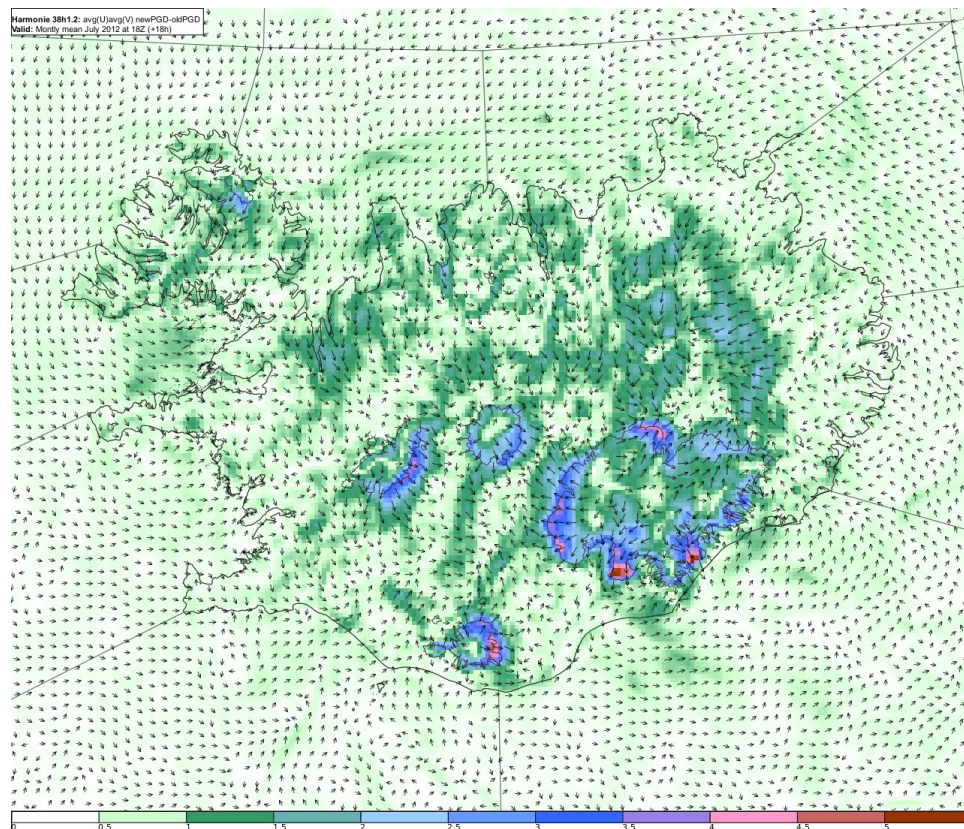
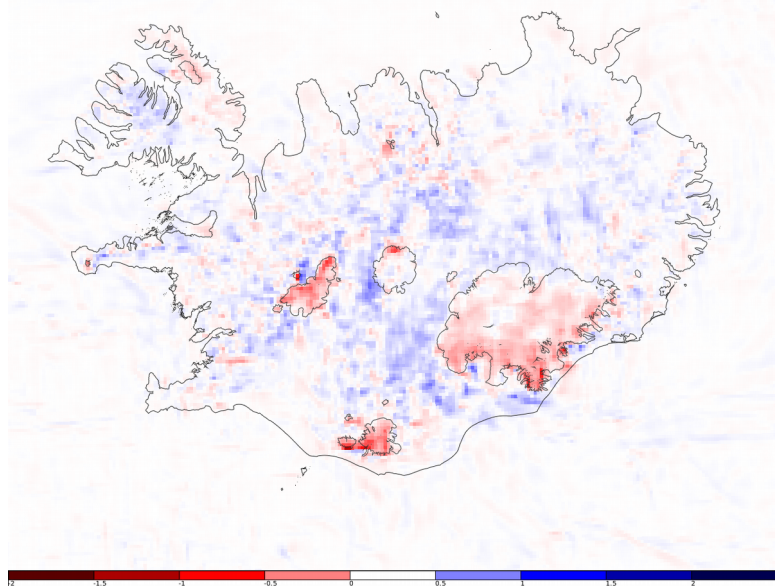
PGD new vs. old verifications for July 2012



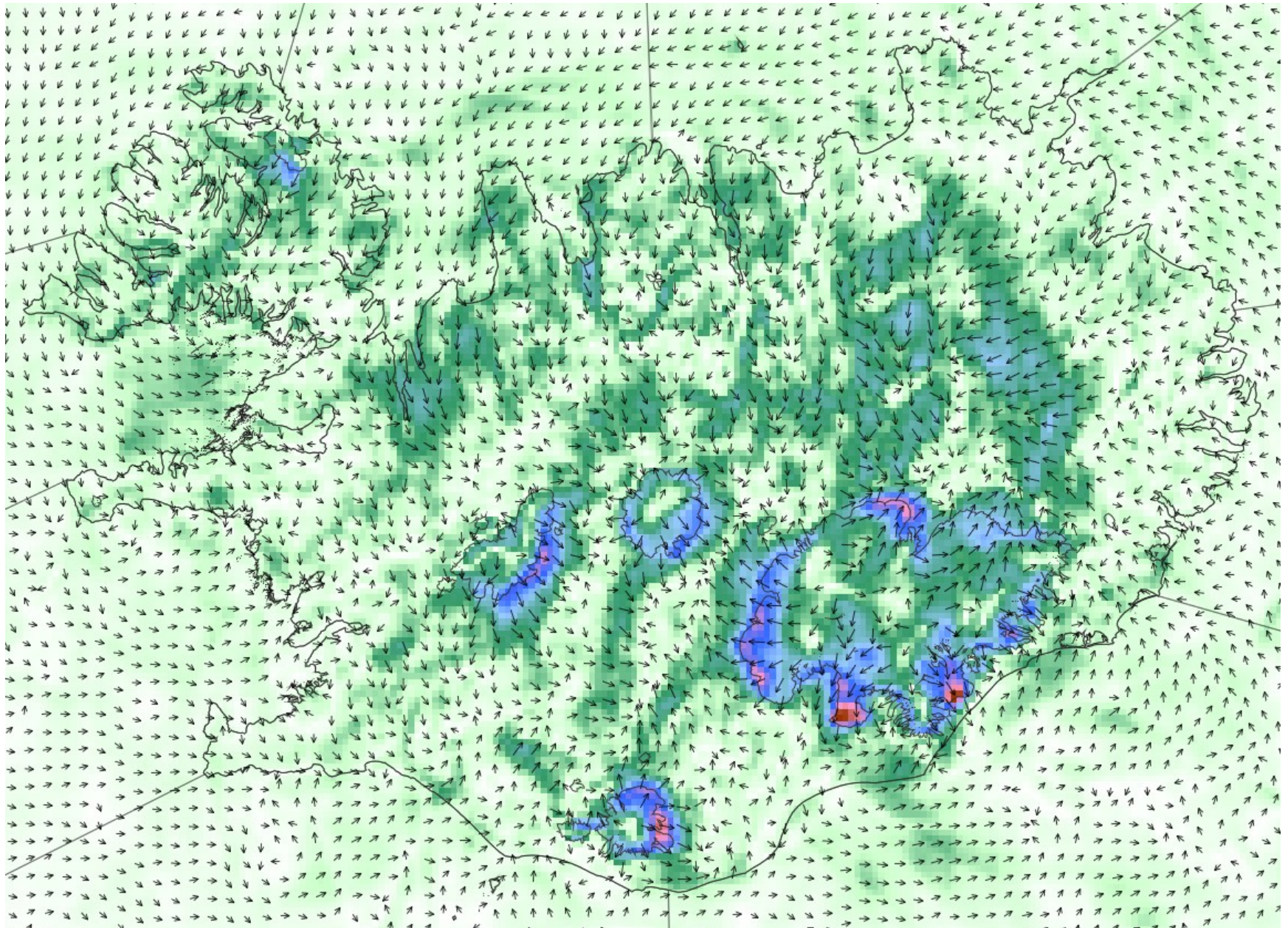
PGD new vs. old - T2m, precipitation and 10m wind



- Lower temperatures seen over glaciers
- Higher temperatures seen in central Iceland over dark sands
- Increased convective precipitation
- Increased katabatic winds from glaciers and increased sea-breeze!



PGD new vs. old: F10m ave. valid at 18Z July 2012



- New physiography databases (PGD) ready for Iceland
- Major upgrade since previous databases had a lot of errors
- Impact of upgrade mostly seen in summer time
- Upgraded PGD been used operationally since autumn 2015 and was used in the ICRA-2016 reanalysis over Iceland
- Big improvements in scores can be expected by upgrading the PGD – especially if it's not good! (*)

(*) The ECOCLIMAP-II was an upgrade over Europe, but Iceland was excluded like most of the world and therefore it probably is quite good for most of Europe

Thanks to prof. Ólafur Arnalds and his
team at Agricultural Uni. of Iceland

Thanks to my colleagues at IMO and
prof. Haraldur Ólafsson

Thank you!

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