

Black Carbon and Dust in Sea ice

Fully coupled comparison against pre-V2 baseline BCASE
(Average over years 10-13 & 30-37)

Fully-coupled Comparison of Black Carbon (BC) and Dust in Sea ice. Optical properties activated. Two test runs: NoScav and Scav

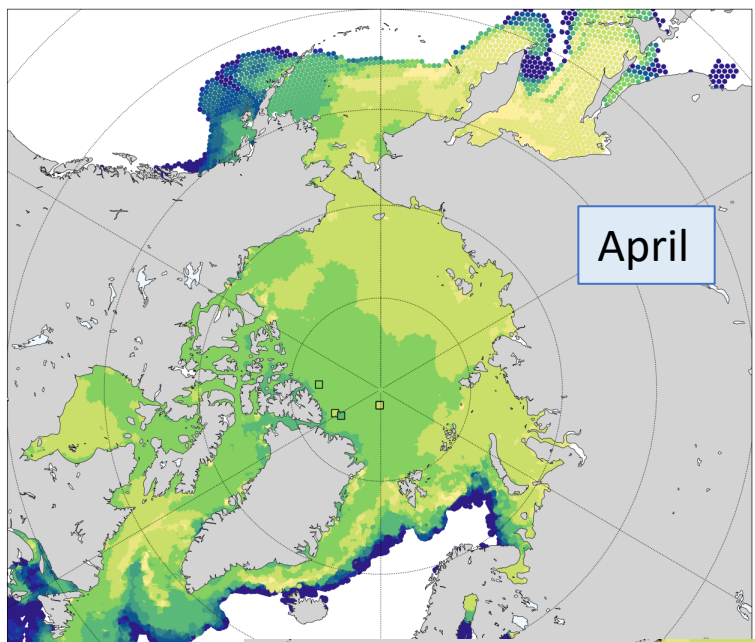
- NoScav
- Kscavz parameter set to 1. Observations suggest this is an underestimation.

This turns off scavenging by sea ice snow crystals which acts as a snow retention mechanism during melt.

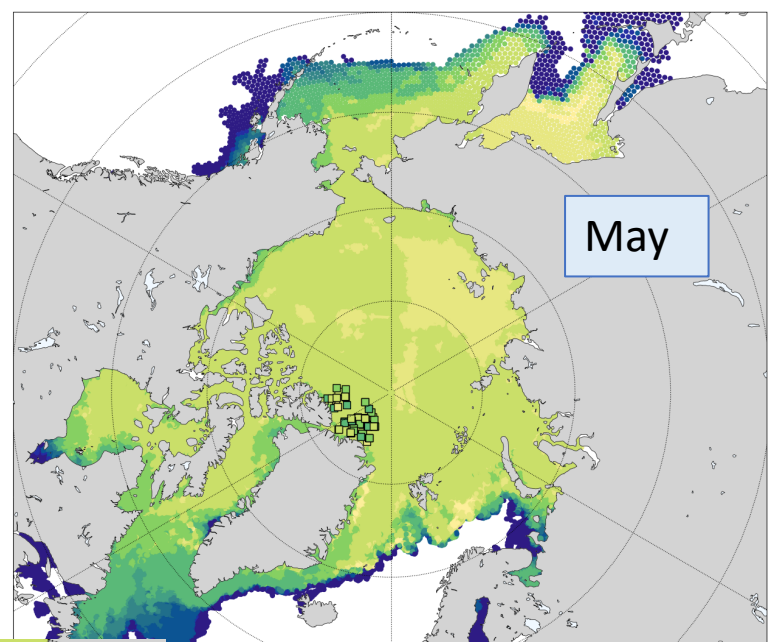
- Scav
- Kscavz parameter set to values used in cesm2 and indicated by observations.

This run has higher accumulation of BC/dust in both snow and ice because a fraction (kscavz) of aerosol mass is preferentially retained in snow during melt

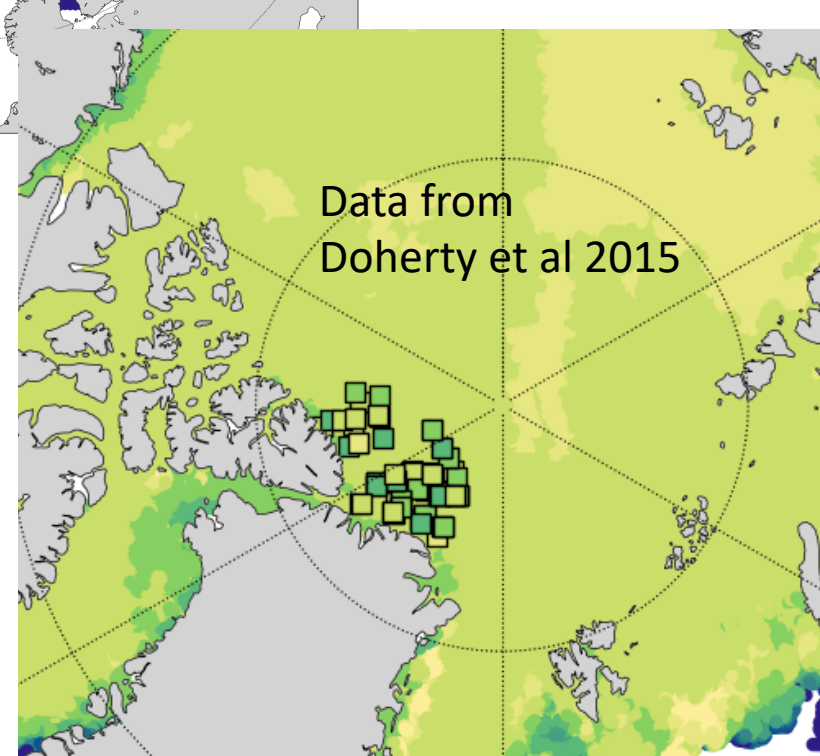
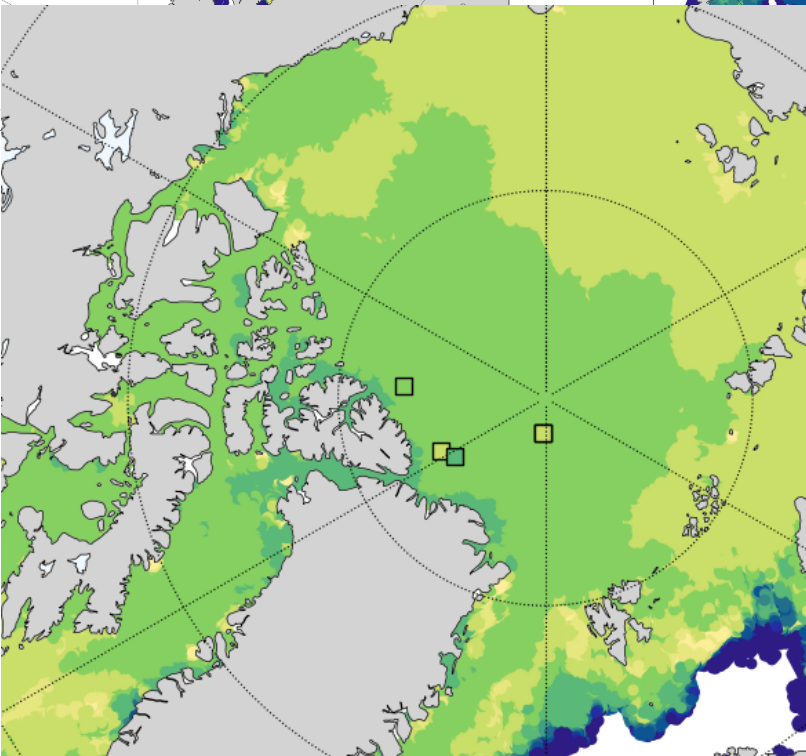
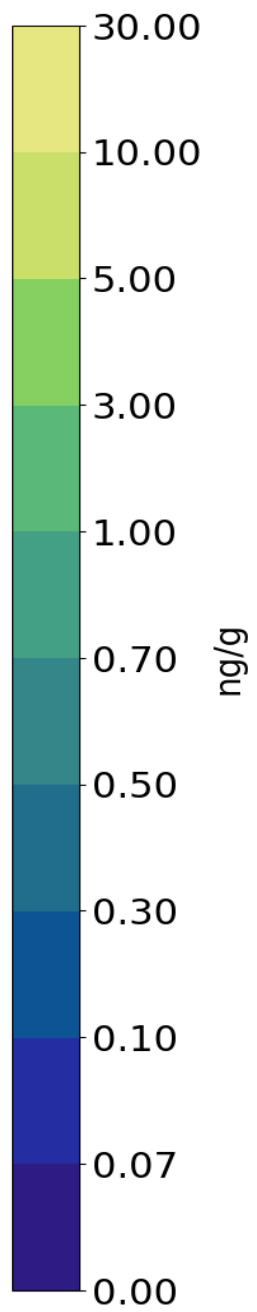
BC in top Snow Layer, Month=04 climatology, over years=10-13



BC in top Snow Layer, Month=05 climatology, over years=10-13

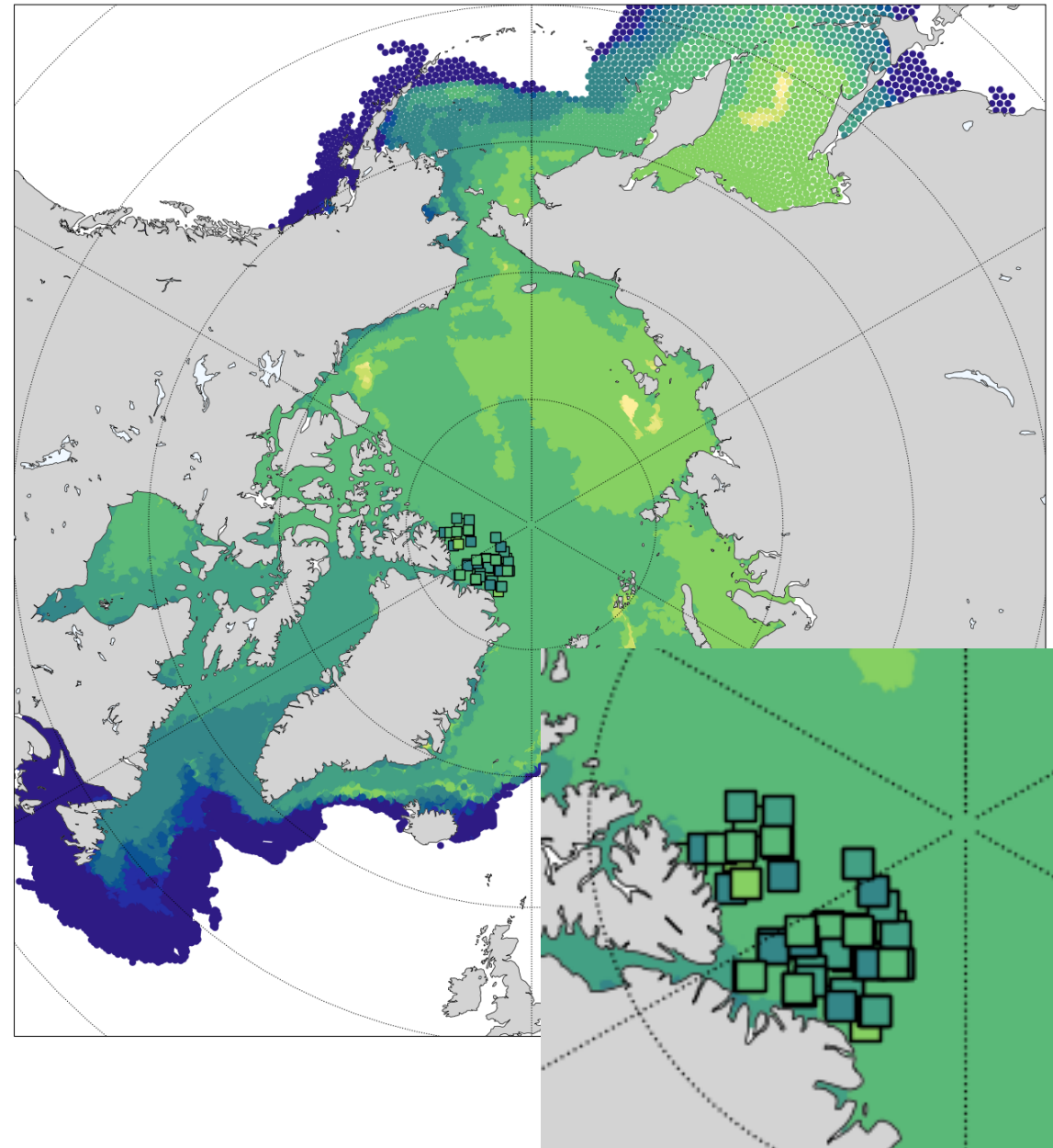


BC mass ratio
in the top
snow layer
(NoScav
years 10-13)



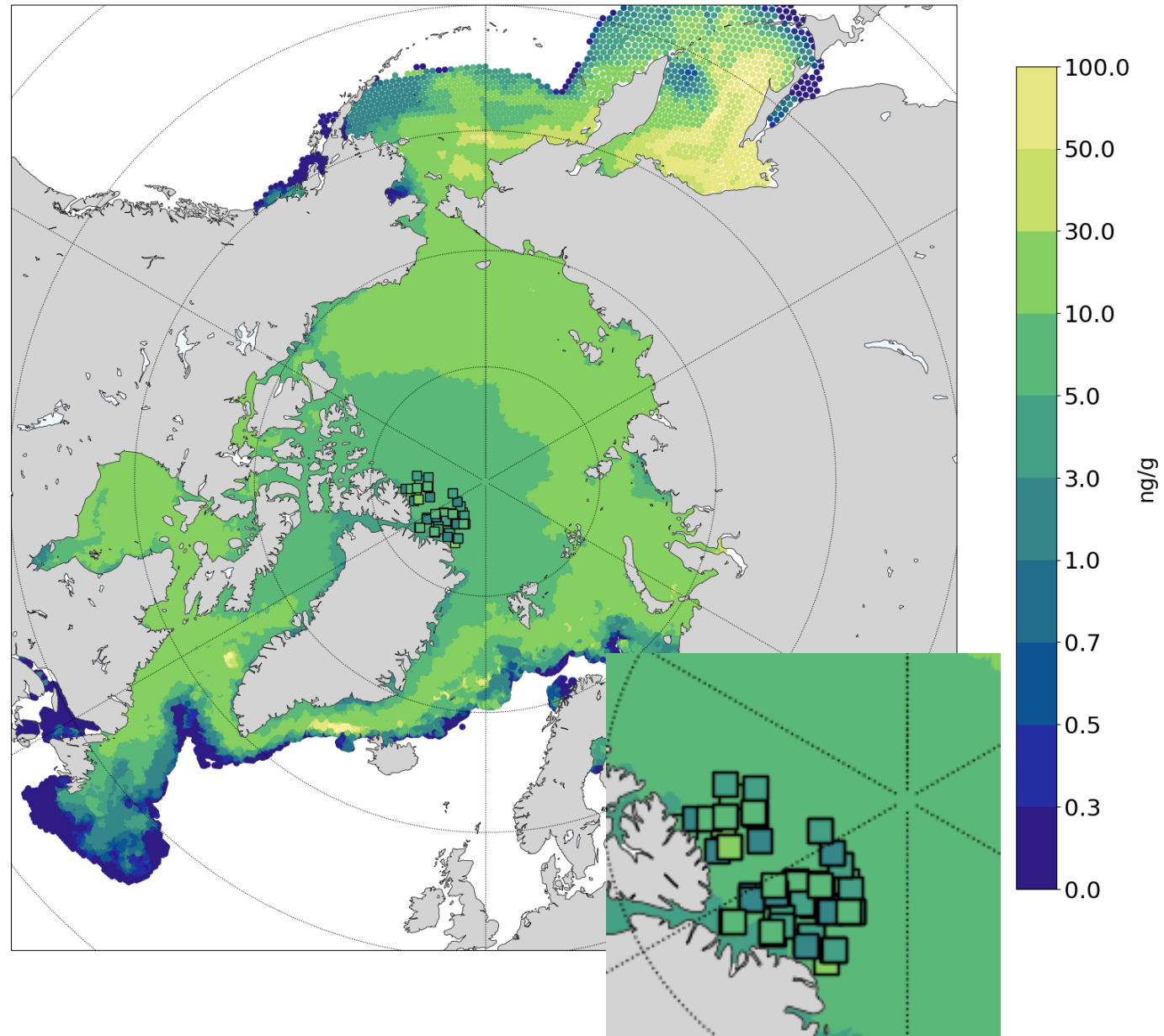
(Years 30-37) NoScav

BC in top Snow Layer, Month=05 climatology, over years=30-37

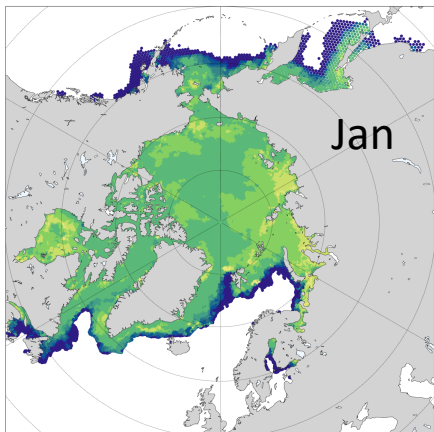


Scav

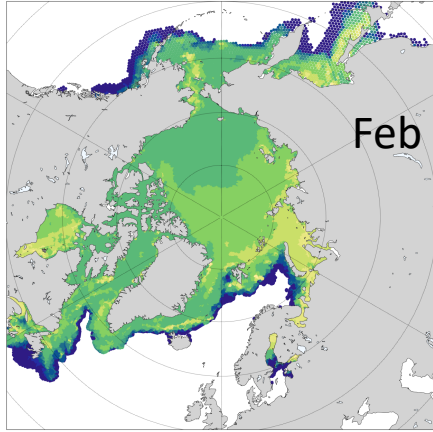
BC in top Snow Layer, Month=05 climatology, over years=30-37



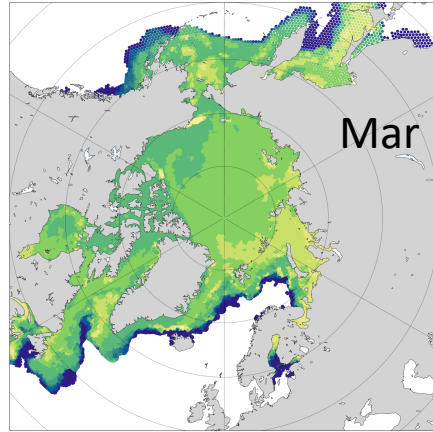
BC in top Snow Layer, Month=01 climatology, over years=10-13



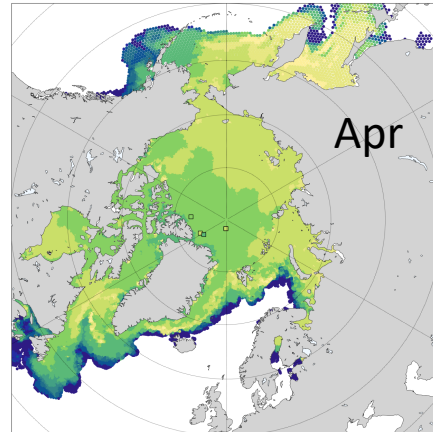
BC in top Snow Layer, Month=02 climatology, over years=10-13



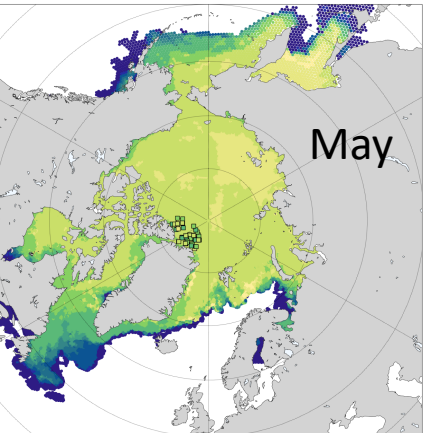
BC in top Snow Layer, Month=03 climatology, over years=10-13



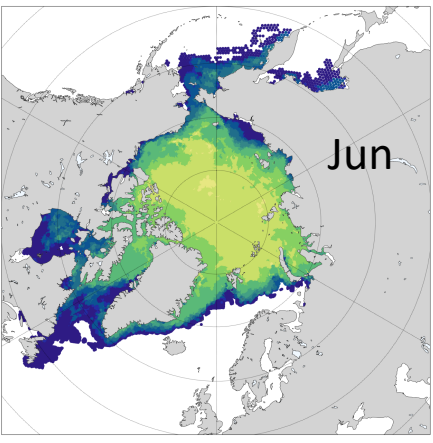
BC in top Snow Layer, Month=04 climatology, over years=10-13



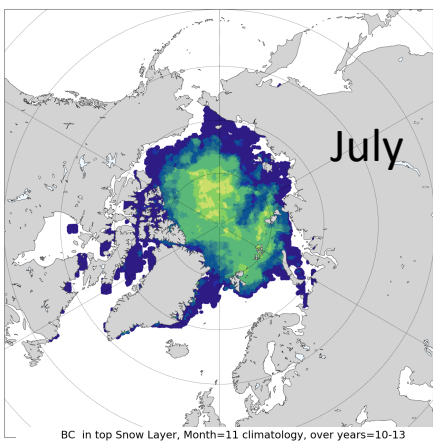
BC in top Snow Layer, Month=05 climatology, over years=10-13



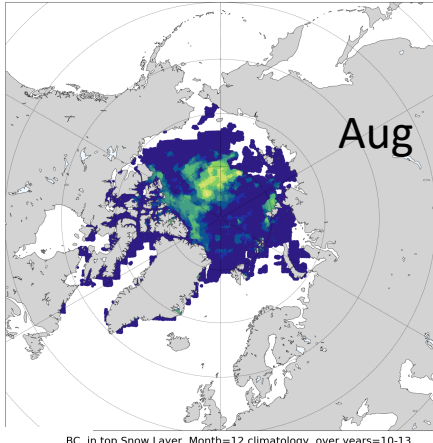
BC in top Snow Layer, Month=06 climatology, over years=10-13



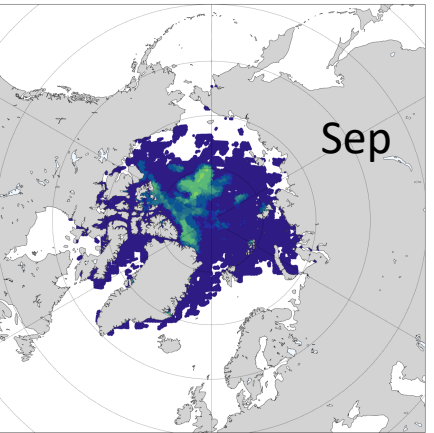
BC in top Snow Layer, Month=07 climatology, over years=10-13



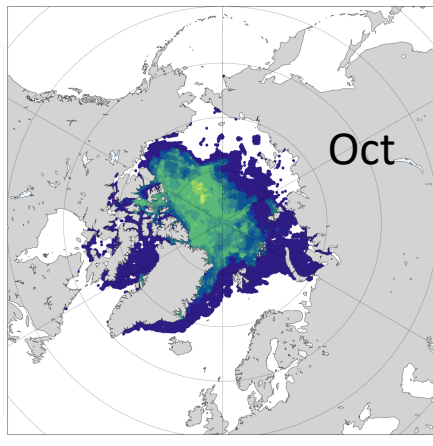
BC in top Snow Layer, Month=08 climatology, over years=10-13



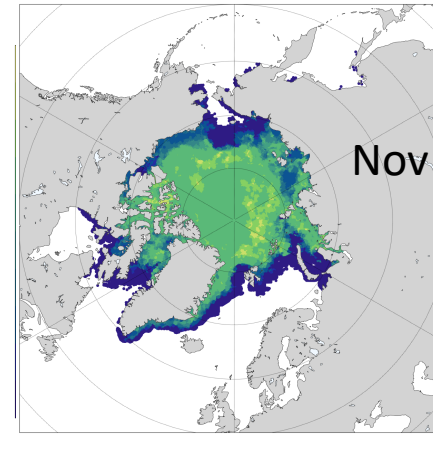
BC in top Snow Layer, Month=09 climatology, over years=10-13



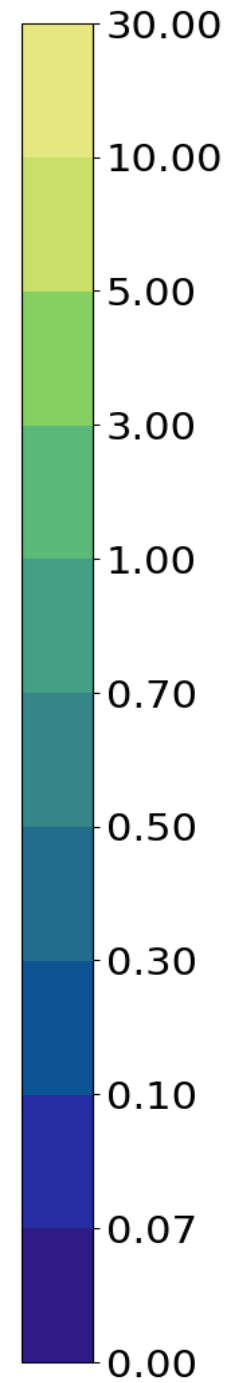
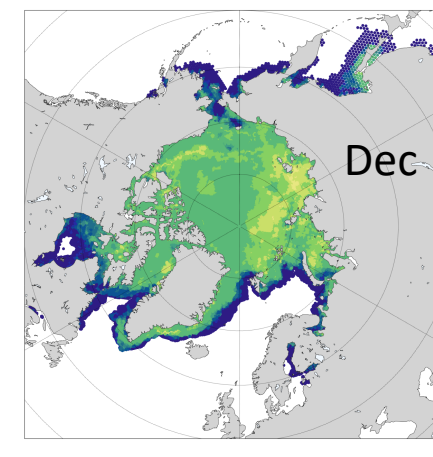
BC in top Snow Layer, Month=10 climatology, over years=10-13



BC in top Snow Layer, Month=11 climatology, over years=10-13



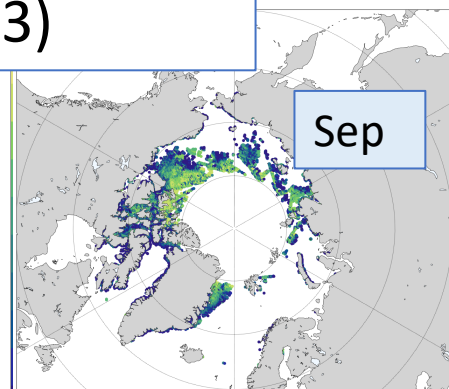
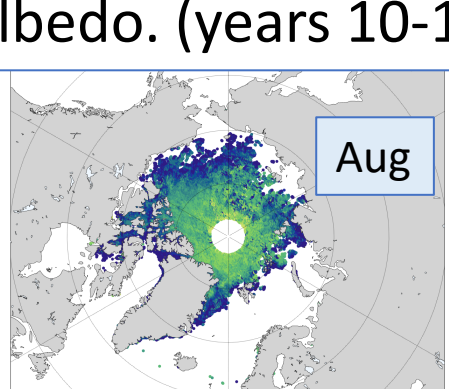
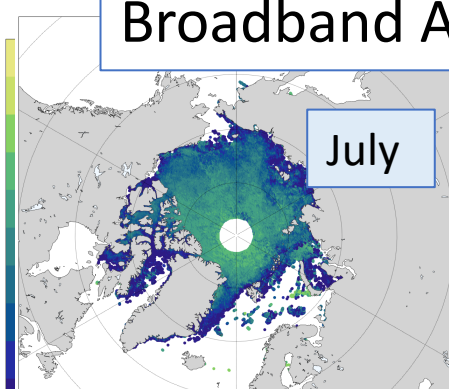
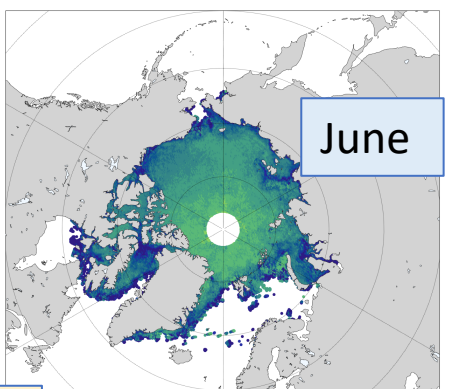
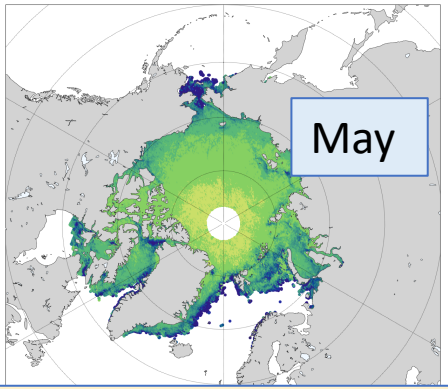
BC in top Snow Layer, Month=12 climatology, over years=10-13



Total Black Carbon snow surface mass ratio. (NoScav) (years 10-13)

ng/g

Broadband Albedo. (years 10-13)



2003-2011 MERIS OBS

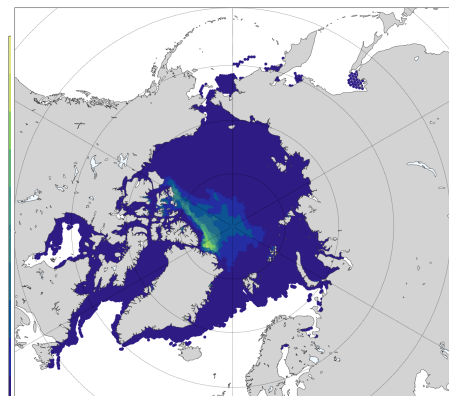
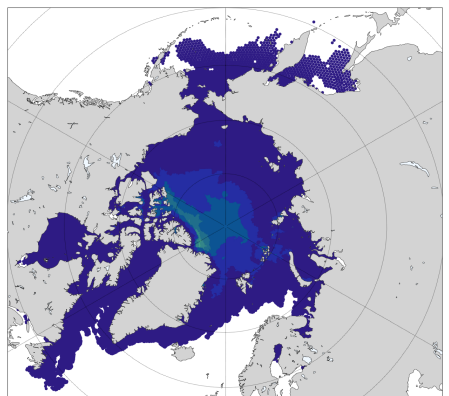
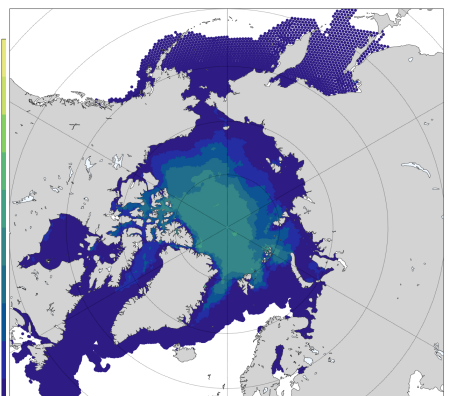
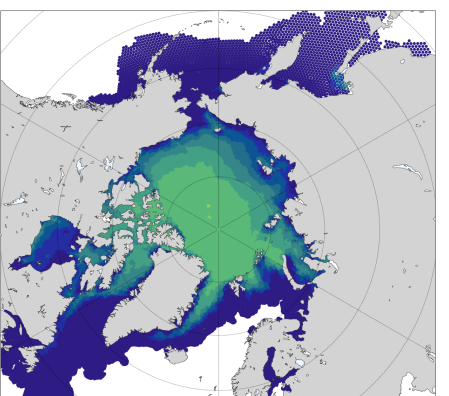
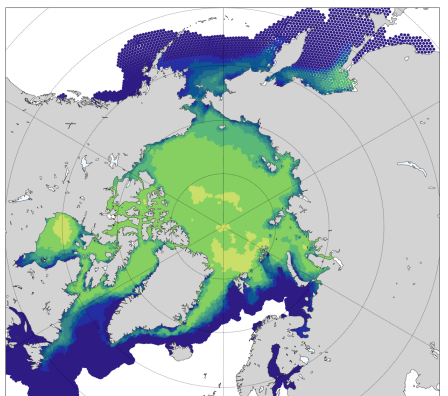
Broadband Albedo, Month=05 climatology, over years=10-13

Broadband Albedo, Month=06 climatology, over years=10-13

Broadband Albedo, Month=07 climatology, over years=10-13

Broadband Albedo, Month=08 climatology, over years=10-13

Broadband Albedo, Month=09 climatology, over years=10-13

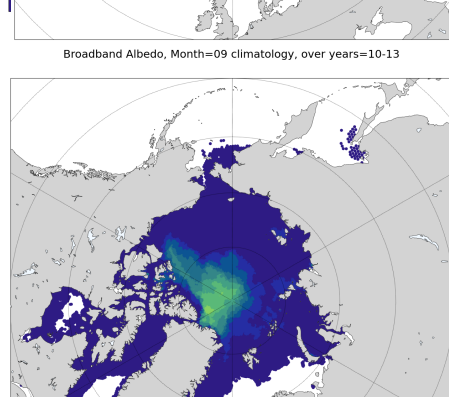
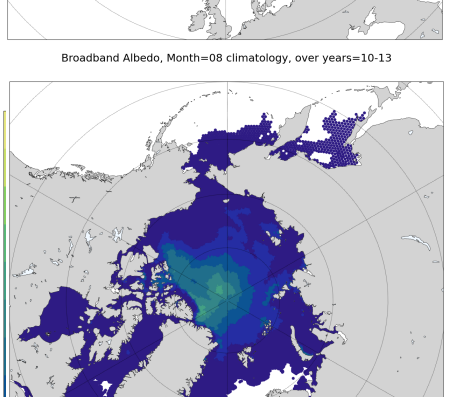
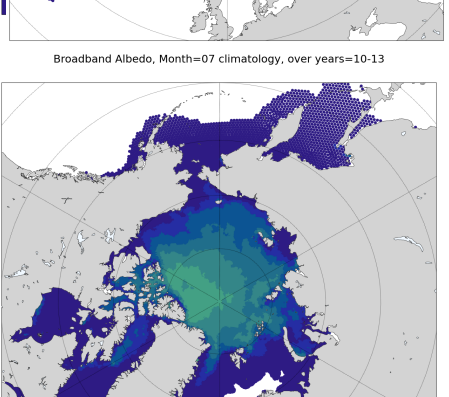
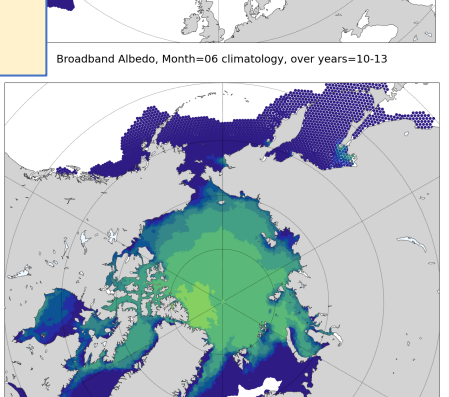
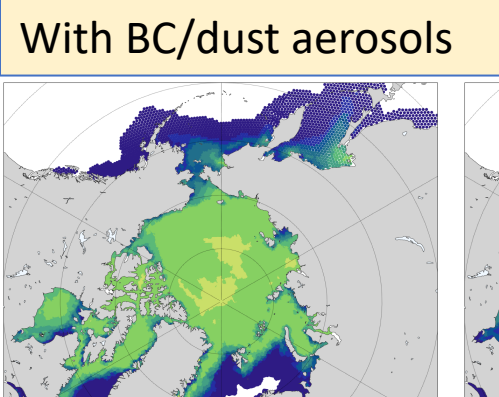


Broadband Albedo, Month=06 climatology, over years=10-13

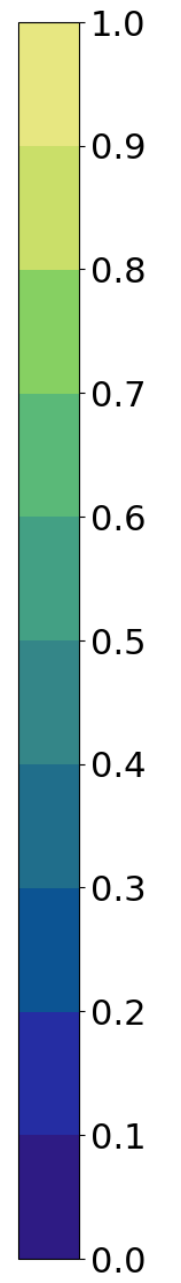
Broadband Albedo, Month=07 climatology, over years=10-13

Broadband Albedo, Month=08 climatology, over years=10-13

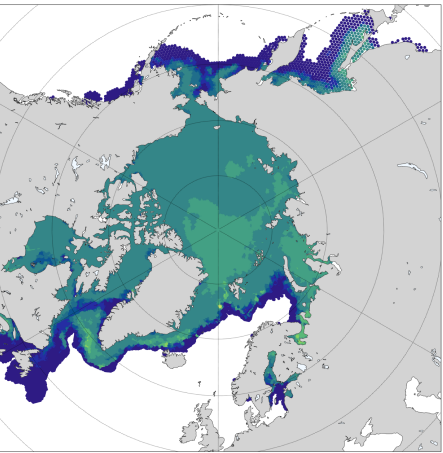
Broadband Albedo, Month=09 climatology, over years=10-13



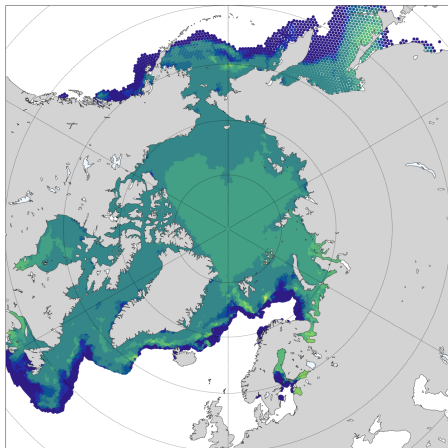
No BC/dust aerosols



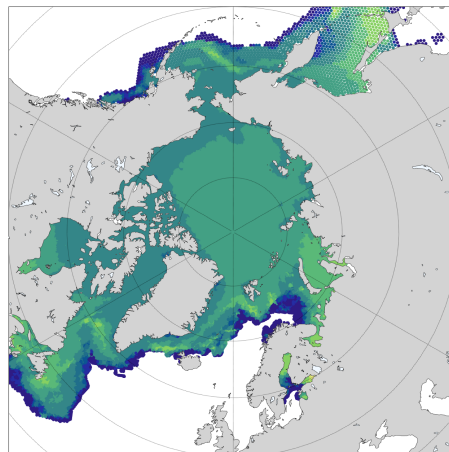
BC in top Snow Layer, Month=01 climatology, over years=30-37



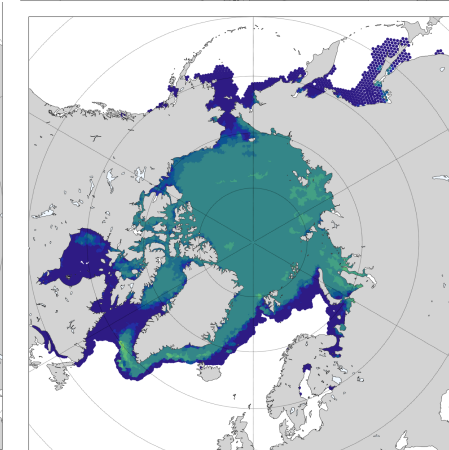
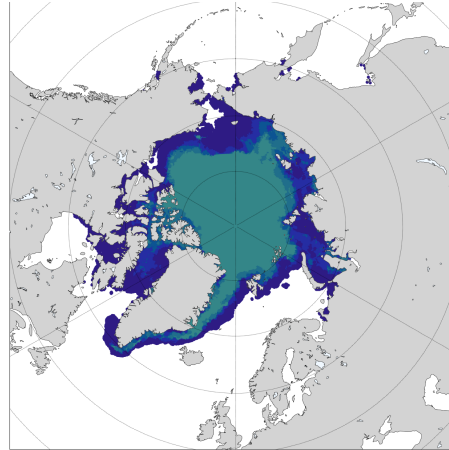
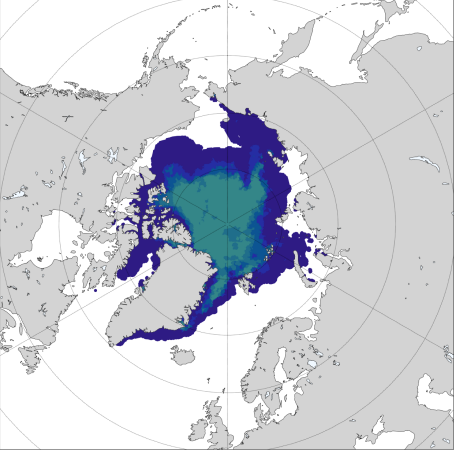
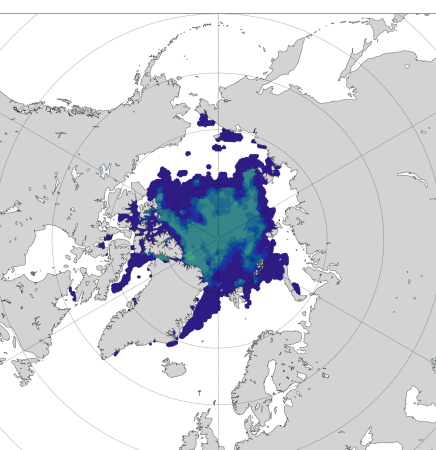
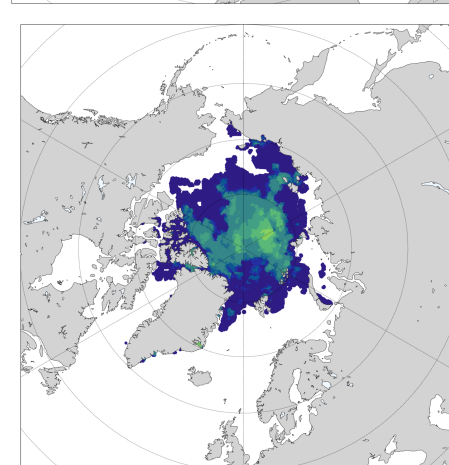
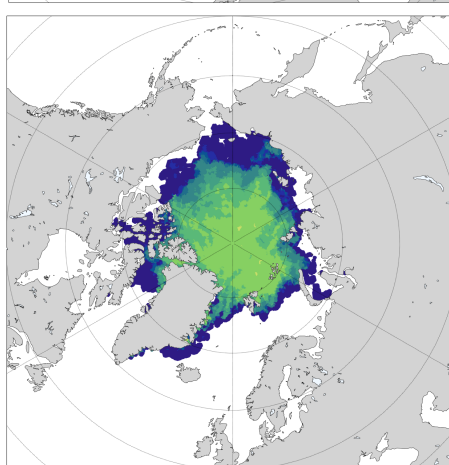
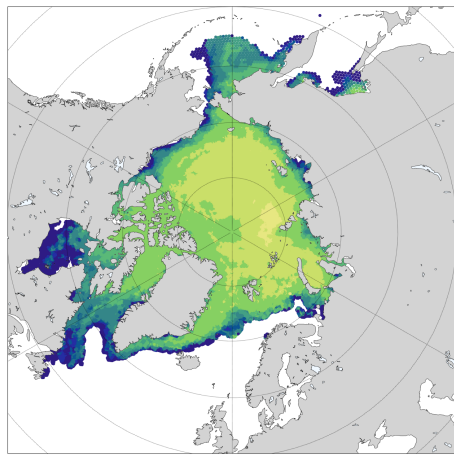
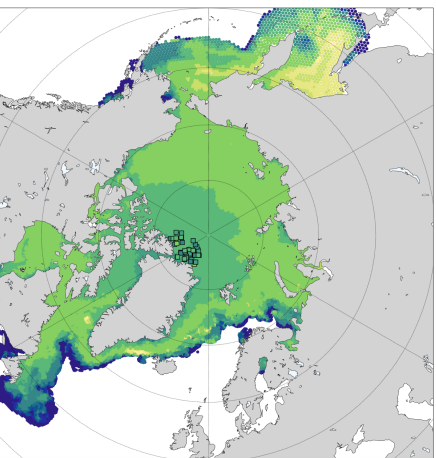
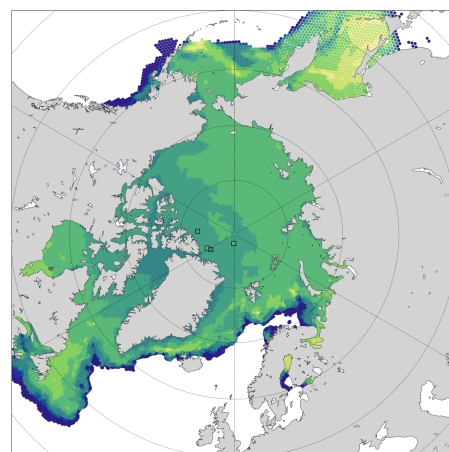
BC in top Snow Layer, Month=02 climatology, over years=30-37



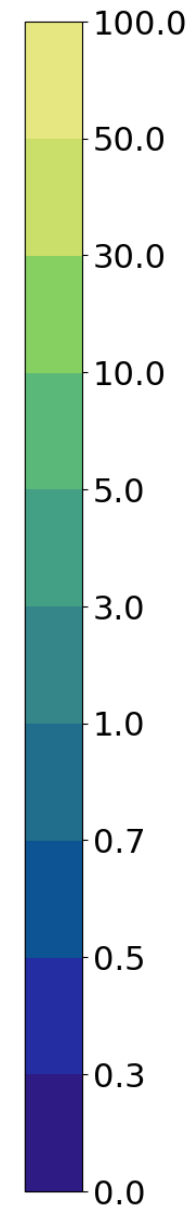
BC in top Snow Layer, Month=03 climatology, over years=30-37



BC in top Snow Layer, Month=04 climatology, over years=30-37



100.0
50.0



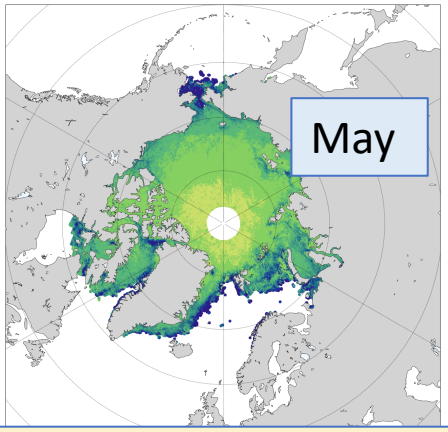
BC/Dust
surface mass
fraction

(Scav:
Years 30-37)

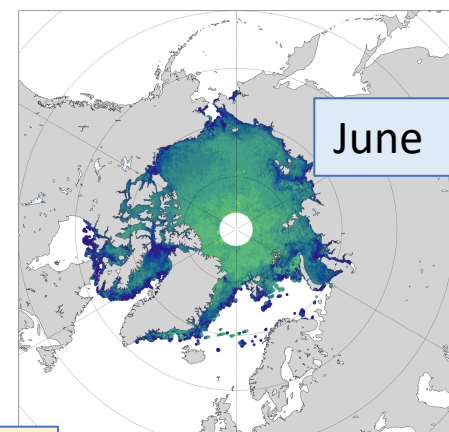
ng/g

0.0

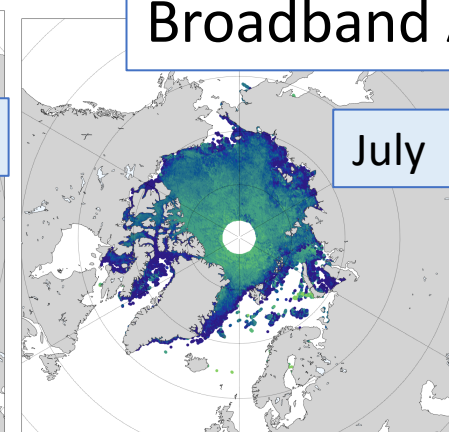
Broadband Albedo. (years 30-37)



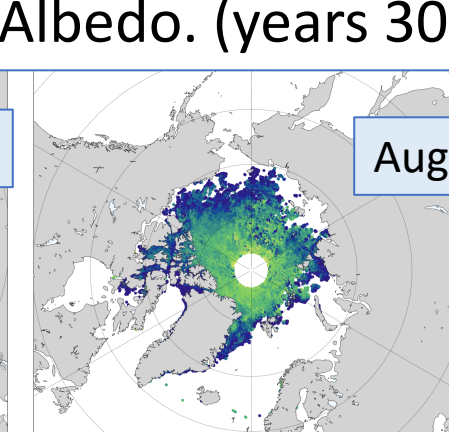
May



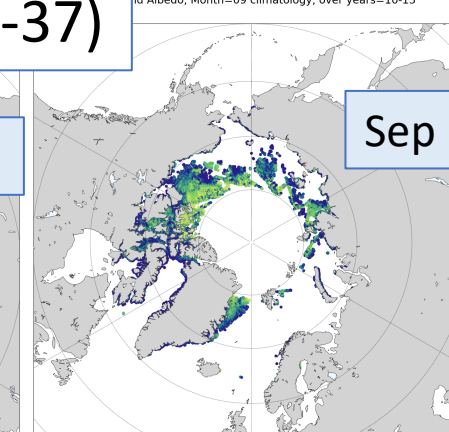
June



July



Aug



Sep

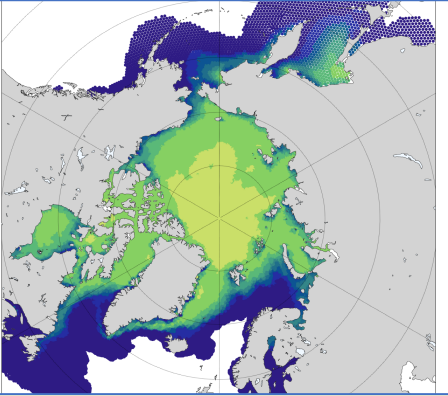
2003-2011 MERIS OBS

Broadband Albedo, Month=06 climatology, over years=30-37

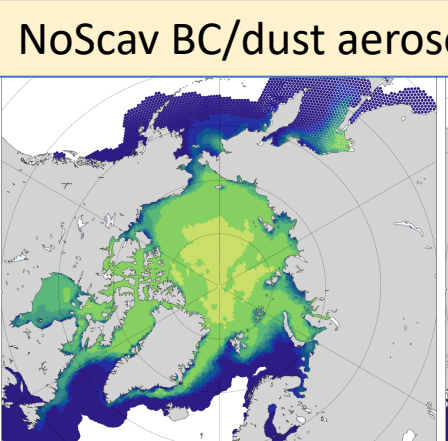
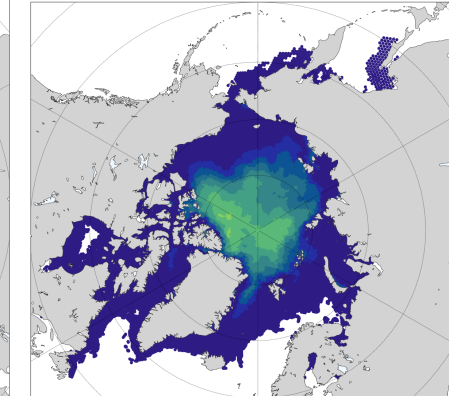
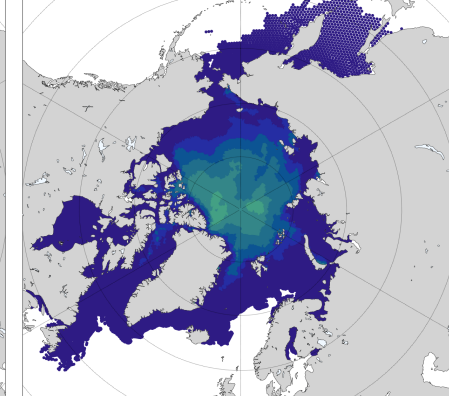
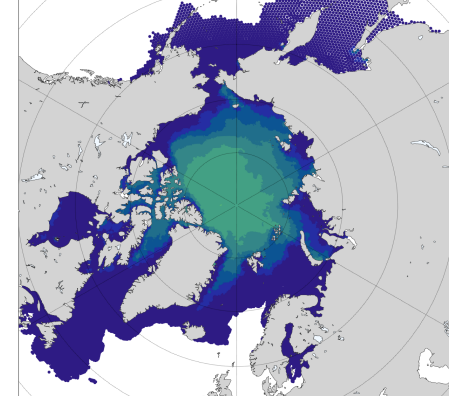
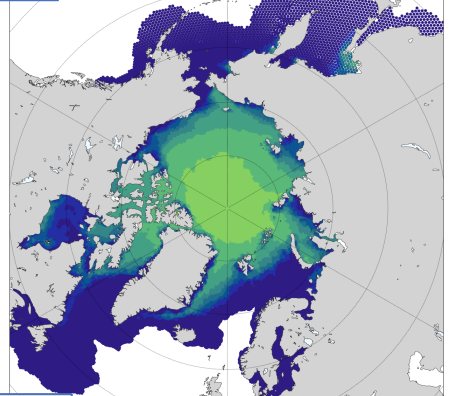
Broadband Albedo, Month=07 climatology, over years=30-37

Broadband Albedo, Month=08 climatology, over years=30-37

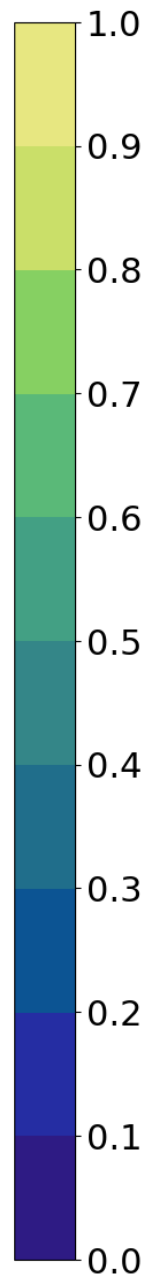
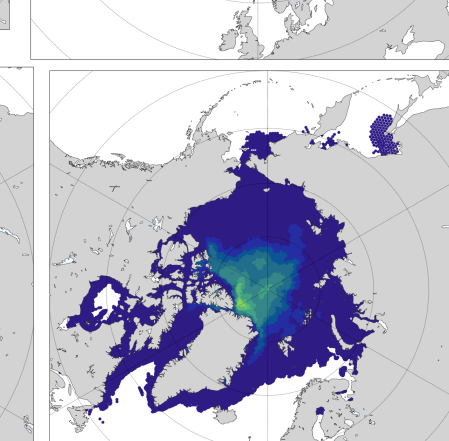
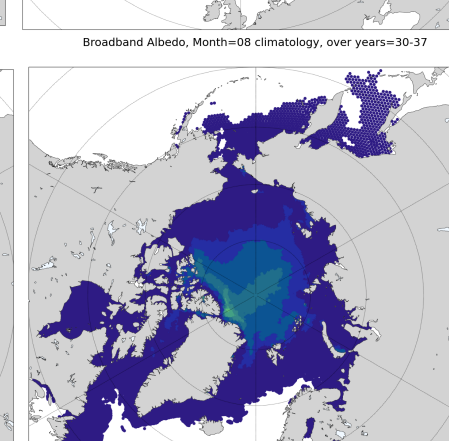
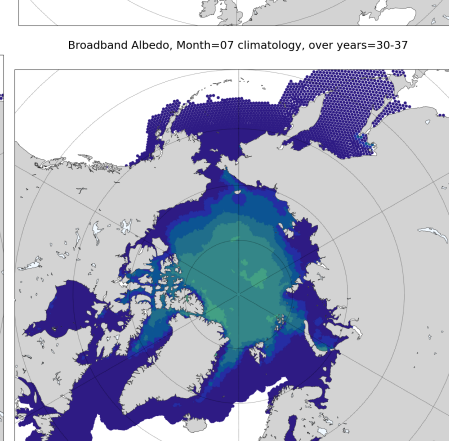
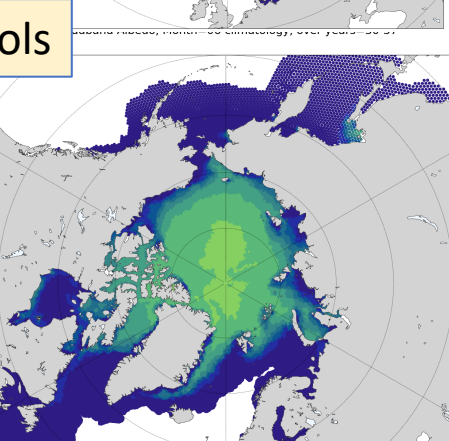
Broadband Albedo, Month=09 climatology, over years=30-37



NoScav BC/dust aerosols

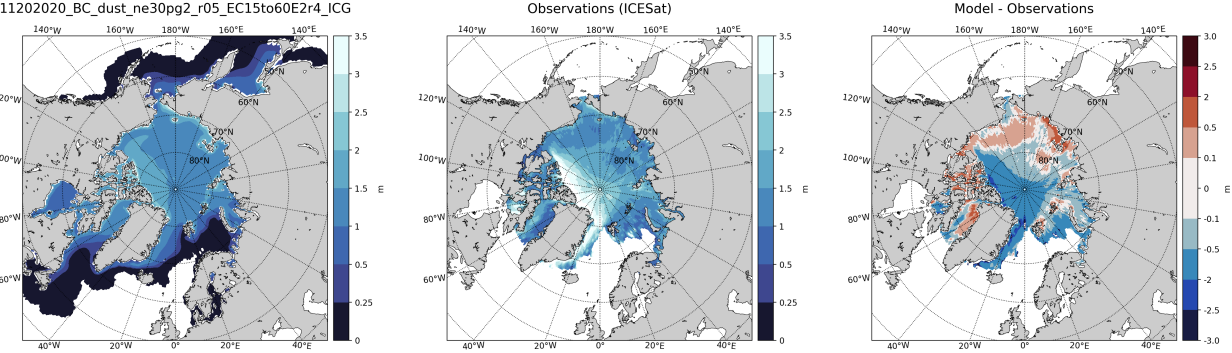


Scav BC/dust aerosols

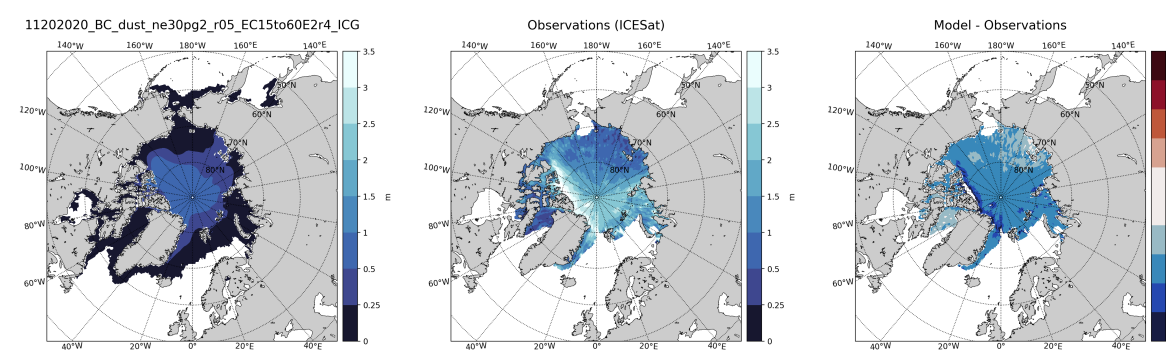


BC/Dust aerosols

Sea ice thickness (FM, years 0011-0038)

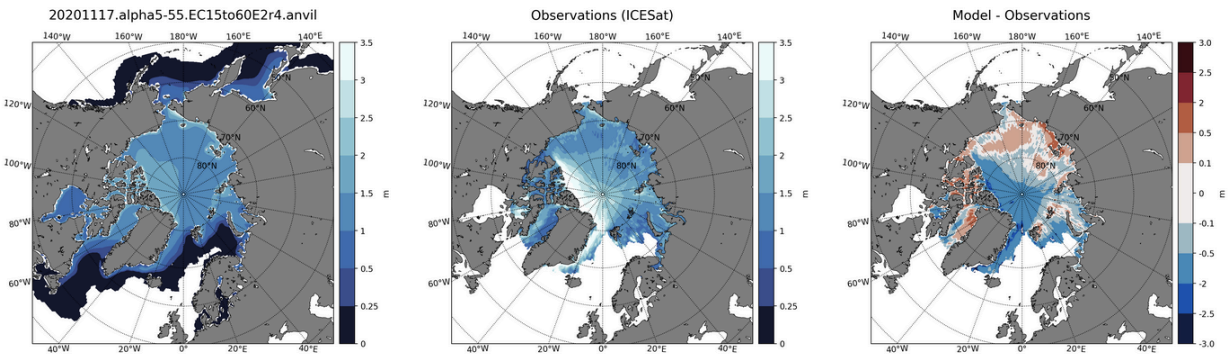


Sea ice thickness (ON, years 0011-0038)

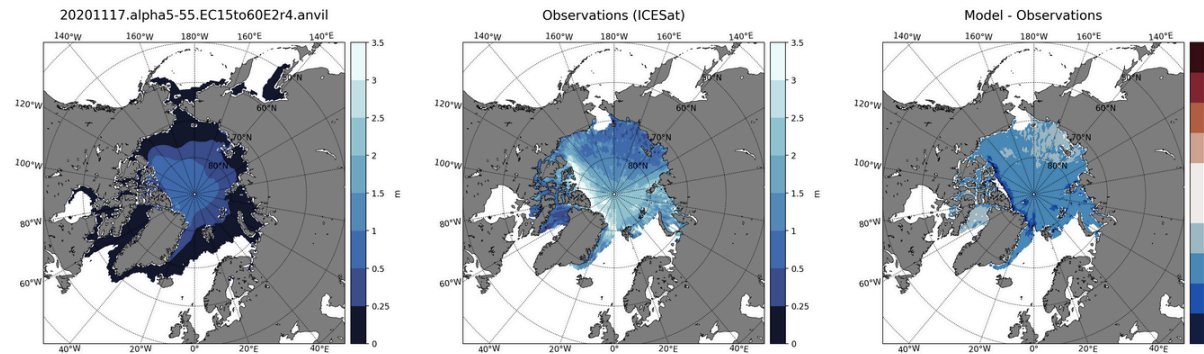


No BC/Dust aerosols

Sea ice thickness (FM, years 0011-0038)



Sea ice thickness (ON, years 0011-0038)



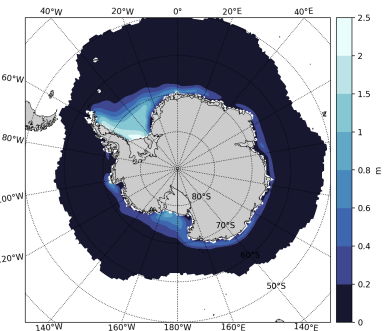
BC/Dust aerosols

Sea ice thickness (FM, years 0011-0038)

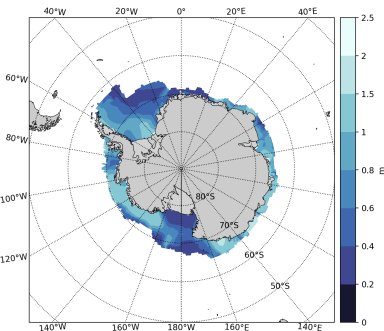
Sea ice thickness (ON, years 0011-0038)

Sea ice thickness (FM, years 0011-0038)

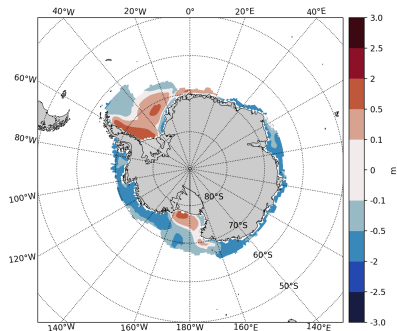
11202020_BC_dust_ne30pg2_r05_EC15to60E2r4_ICG



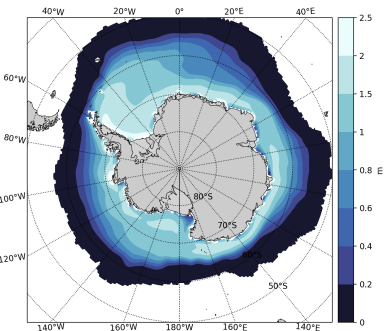
Observations (ICESat)



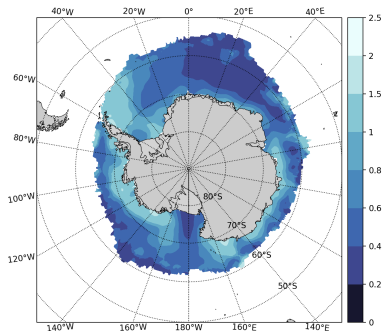
Model - Observations



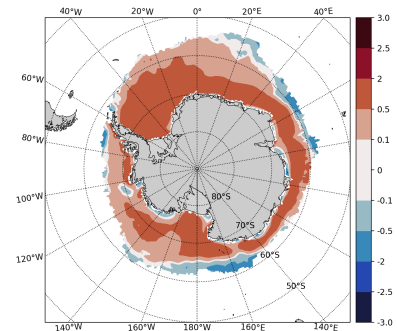
11202020_BC_dust_ne30pg2_r05_EC15to60E2r4_ICG



Observations (ICESat)



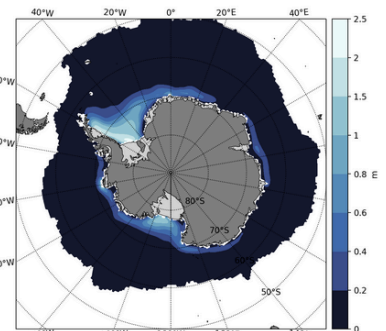
Model - Observations



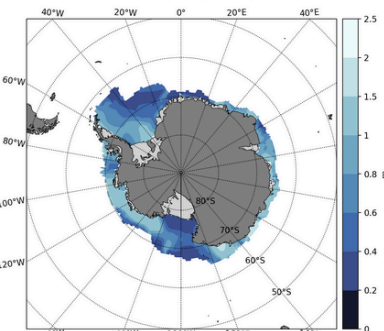
No BC/Dust aerosols

Sea ice thickness (FM, years 0011-0038)

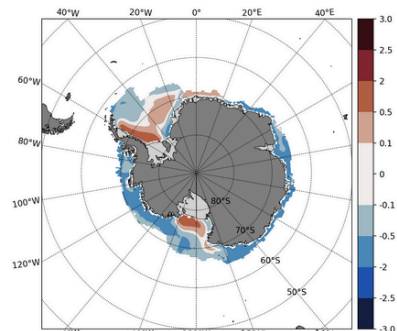
20201117.alpha5-55.EC15to60E2r4.anvil



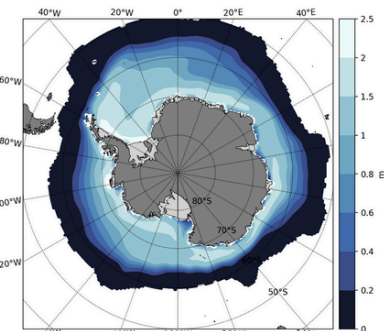
Observations (ICESat)



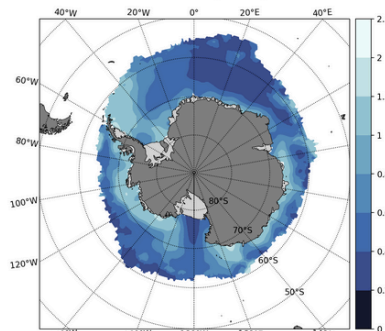
Model - Observations



20201117.alpha5-55.EC15to60E2r4.anvil



Observations (ICESat)



Model - Observations

