

Land cover and land use changes as a driver for Earth system changes in the Baltic Sea region (Baltic Earth)

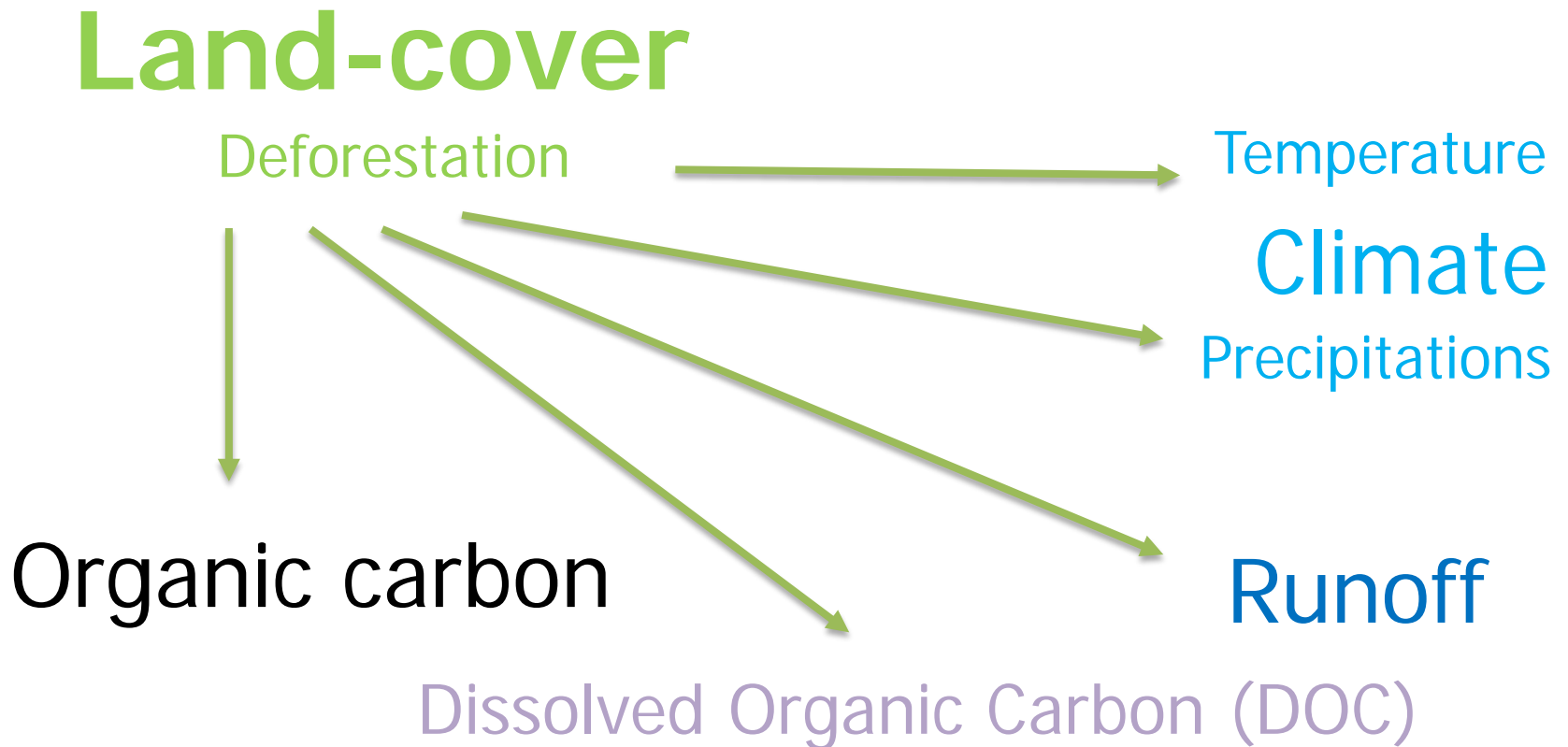
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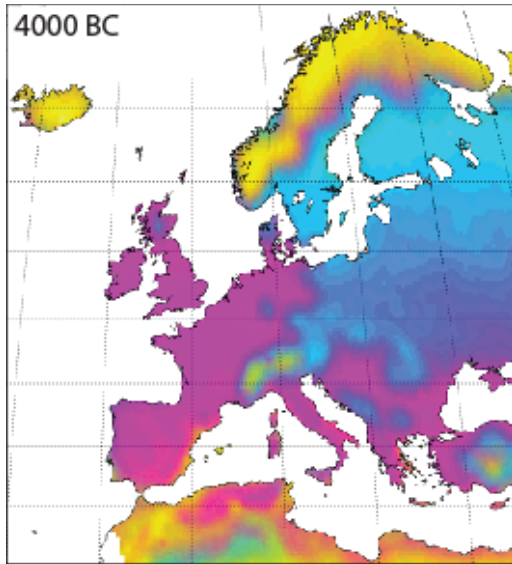
Land-cover as a driver of the Earth System

Aim: Better understand the role of the land-cover as a long term driver of the Earth System changes.

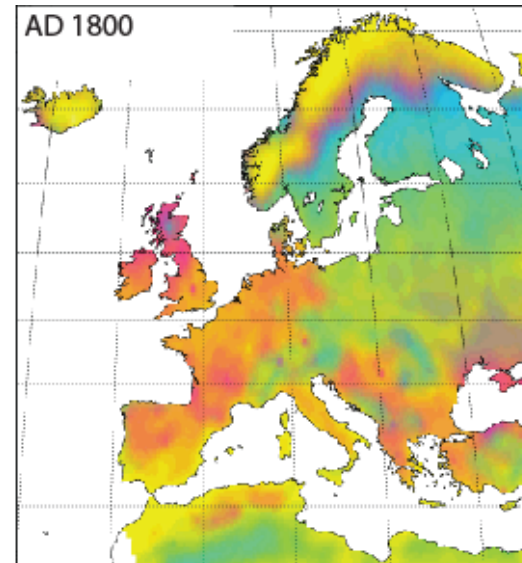


How: Combining paleoenvironmental records with ecosystem and climate modelling.

Anthropogenic deforestation of Europe



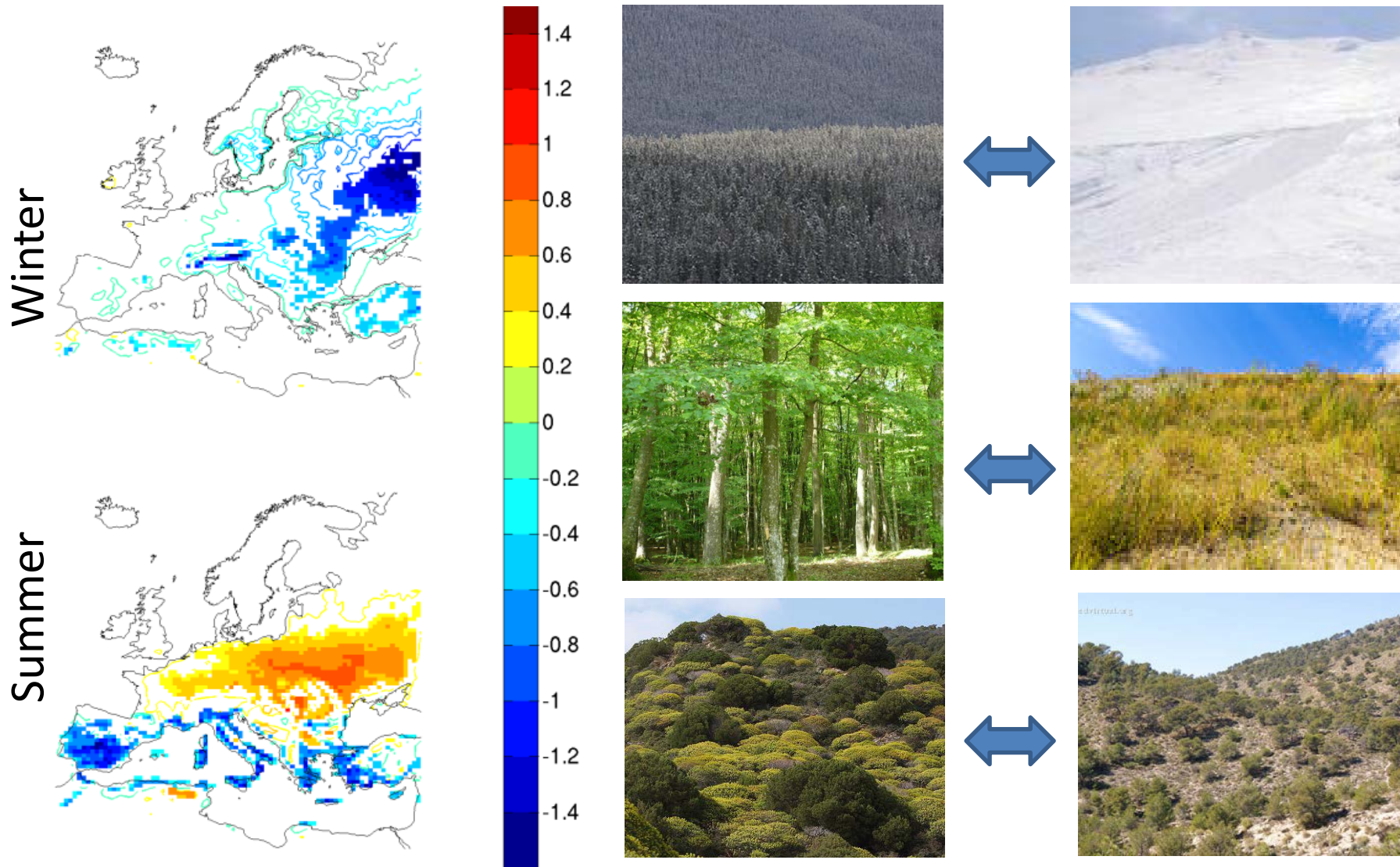
4000 BC – forested landscape with low natural openness;



AD 1800 – open cultural landscape.

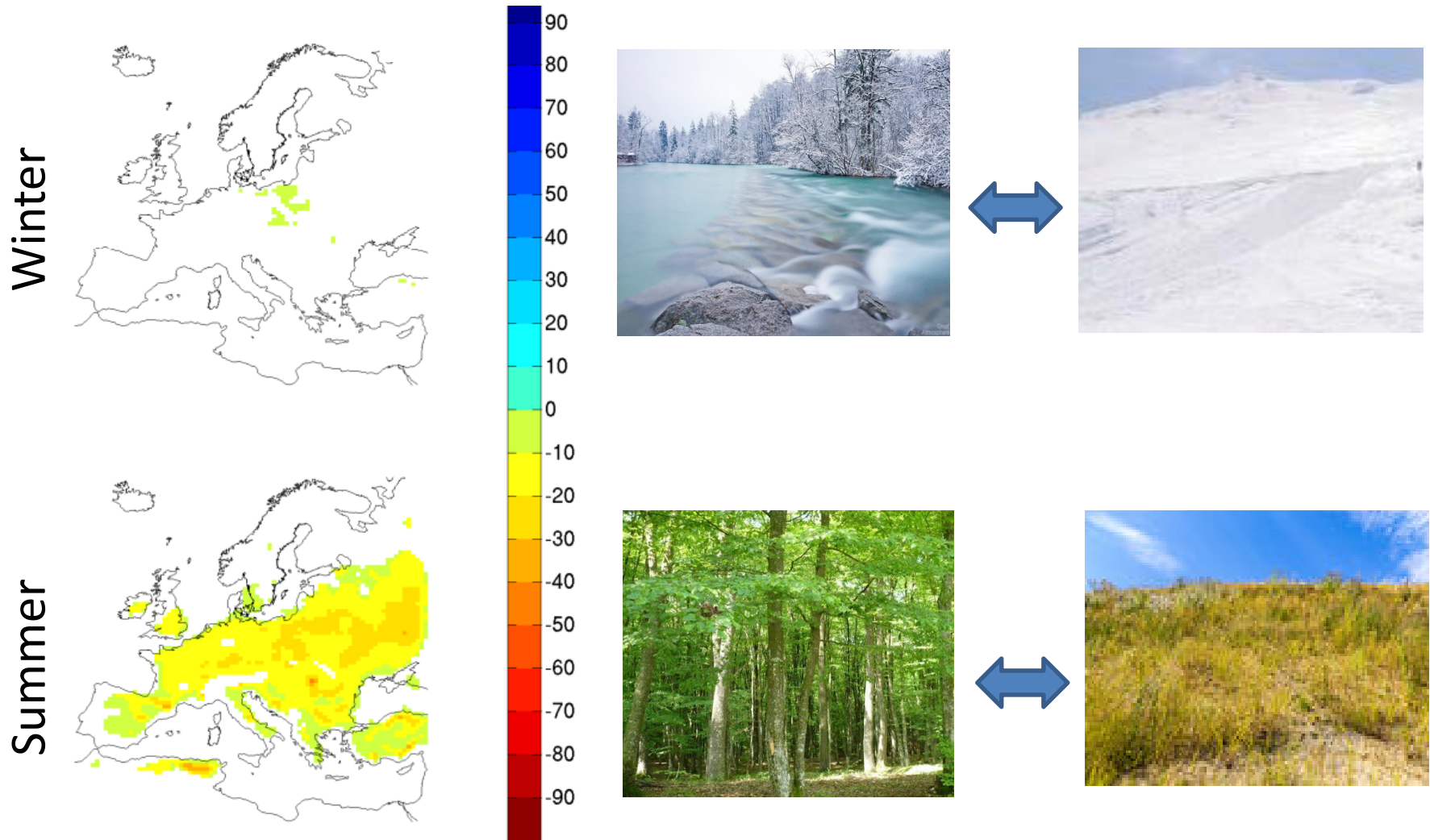
Legend:
violet – broadleaved forest
blue – coniferous forest
Yellow – open land.

Anthropogenic deforestation of temperate forest zone



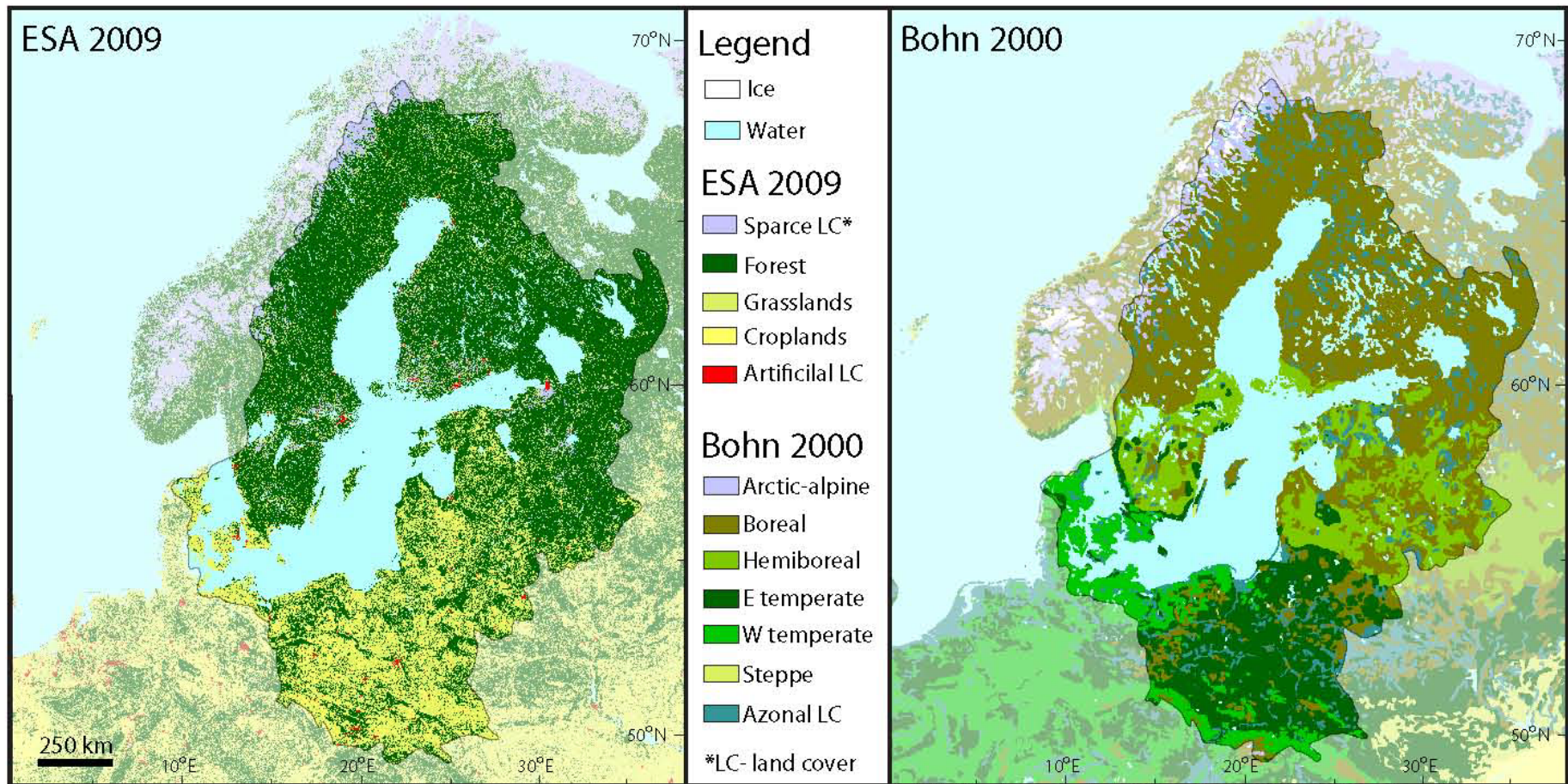
Estimated temperature changes due to anthropogenic deforestation.

Anthropogenic deforestation of temperate forest zone

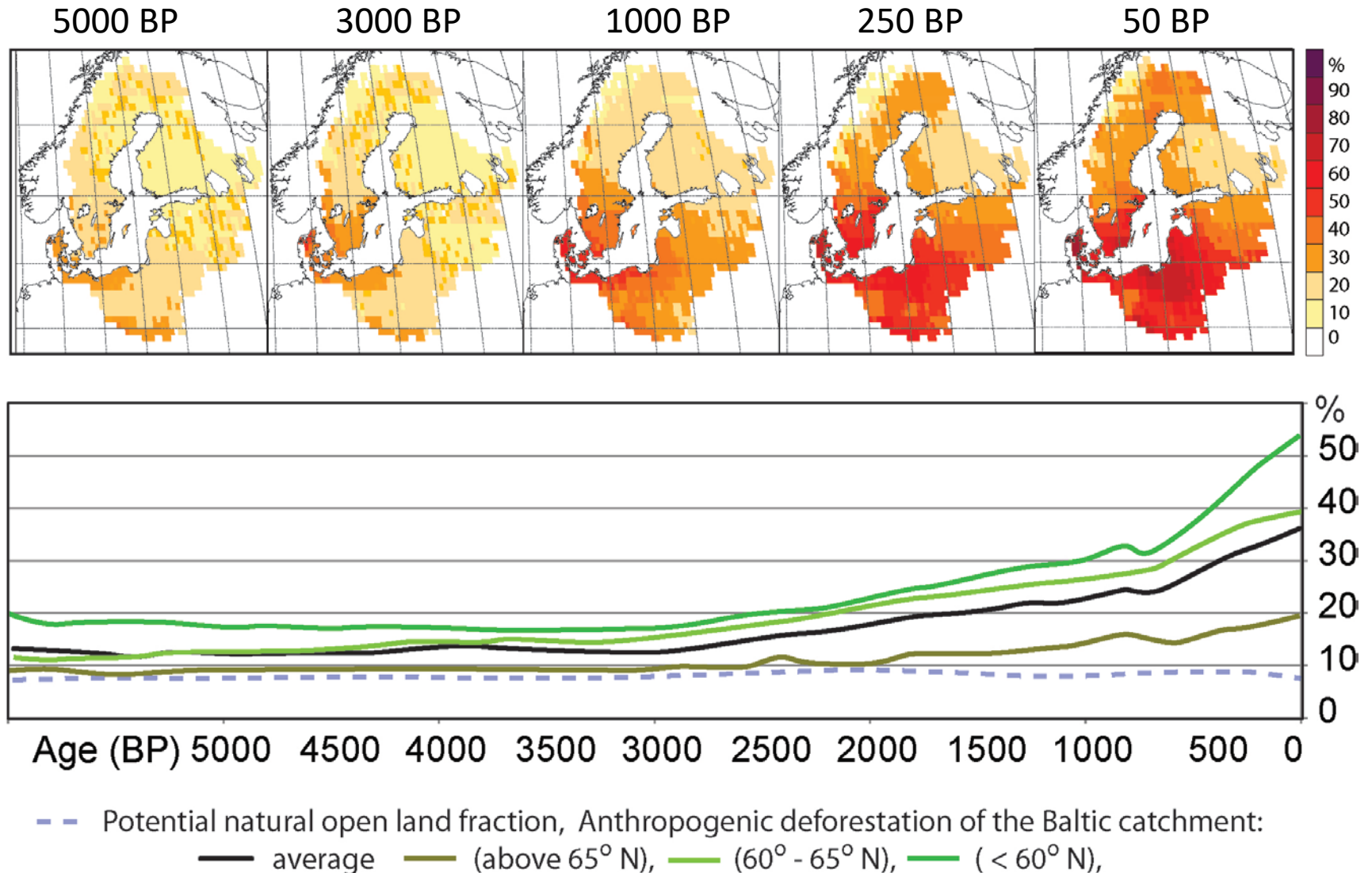


Estimated precipitation (mm/months) changes due to anthropogenic deforestation.

Land-cover of the Baltic catchment

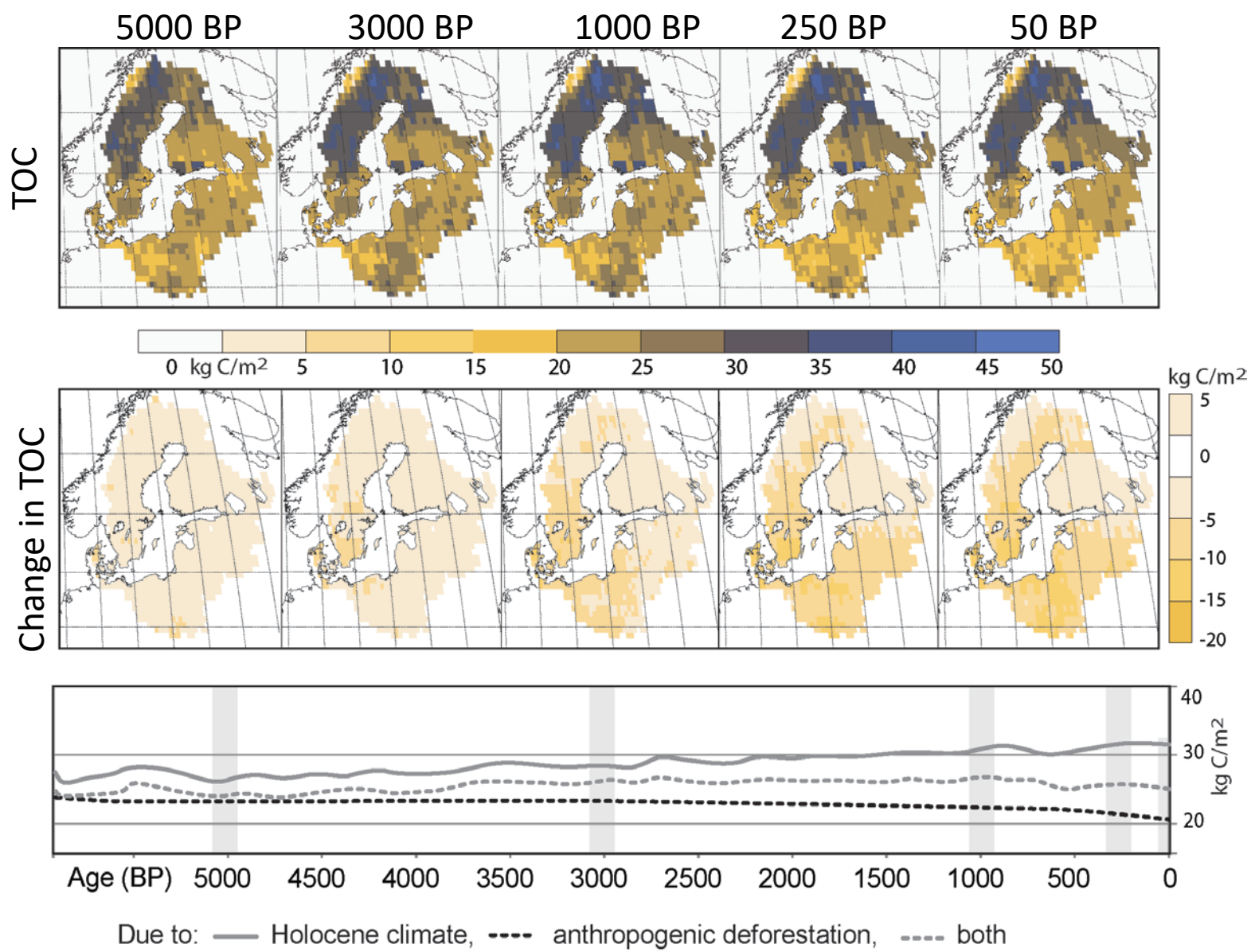


Long term deforestation of the Baltic catchment (pollen based reconstructions)

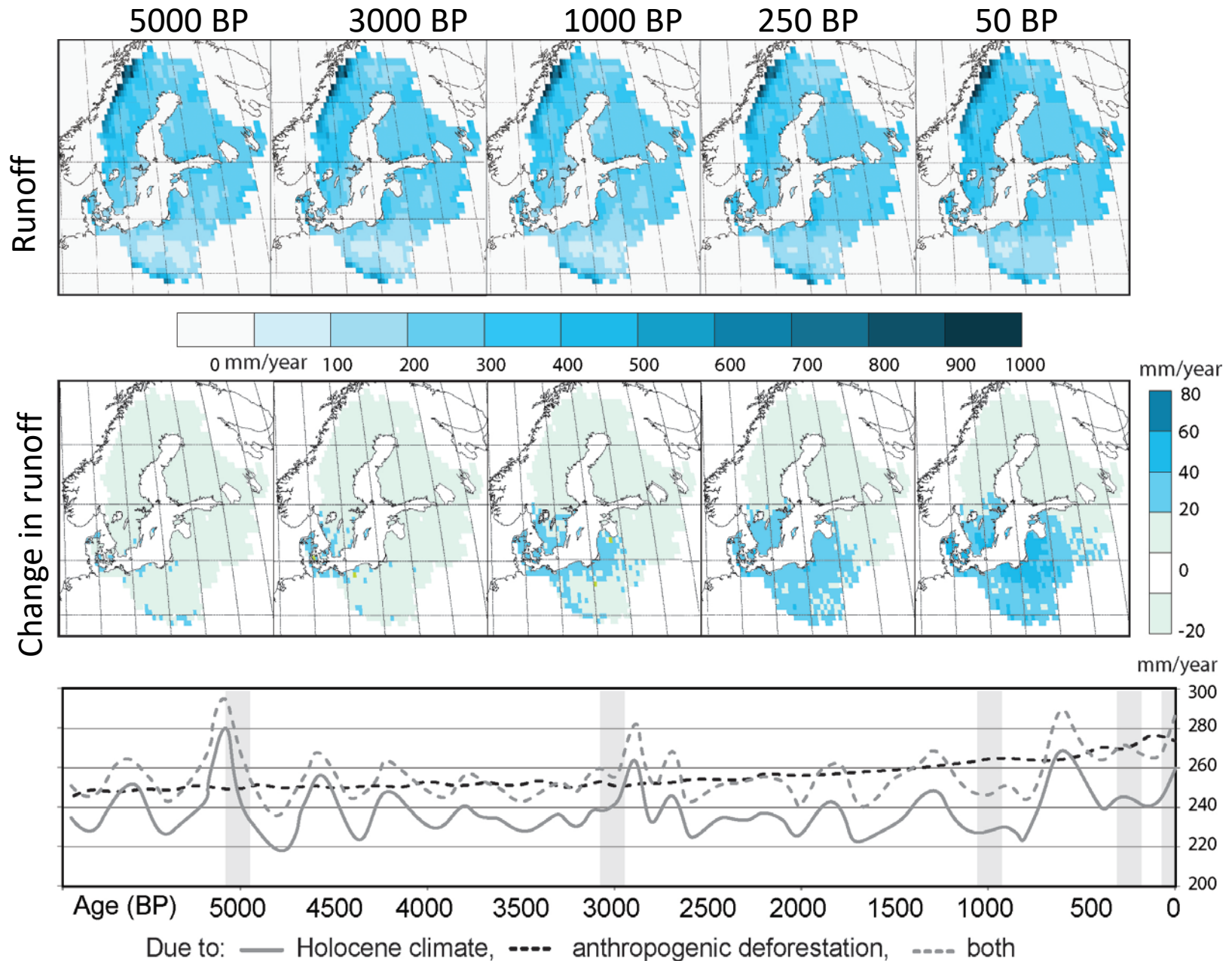


after Pirzamanbein et al 2018

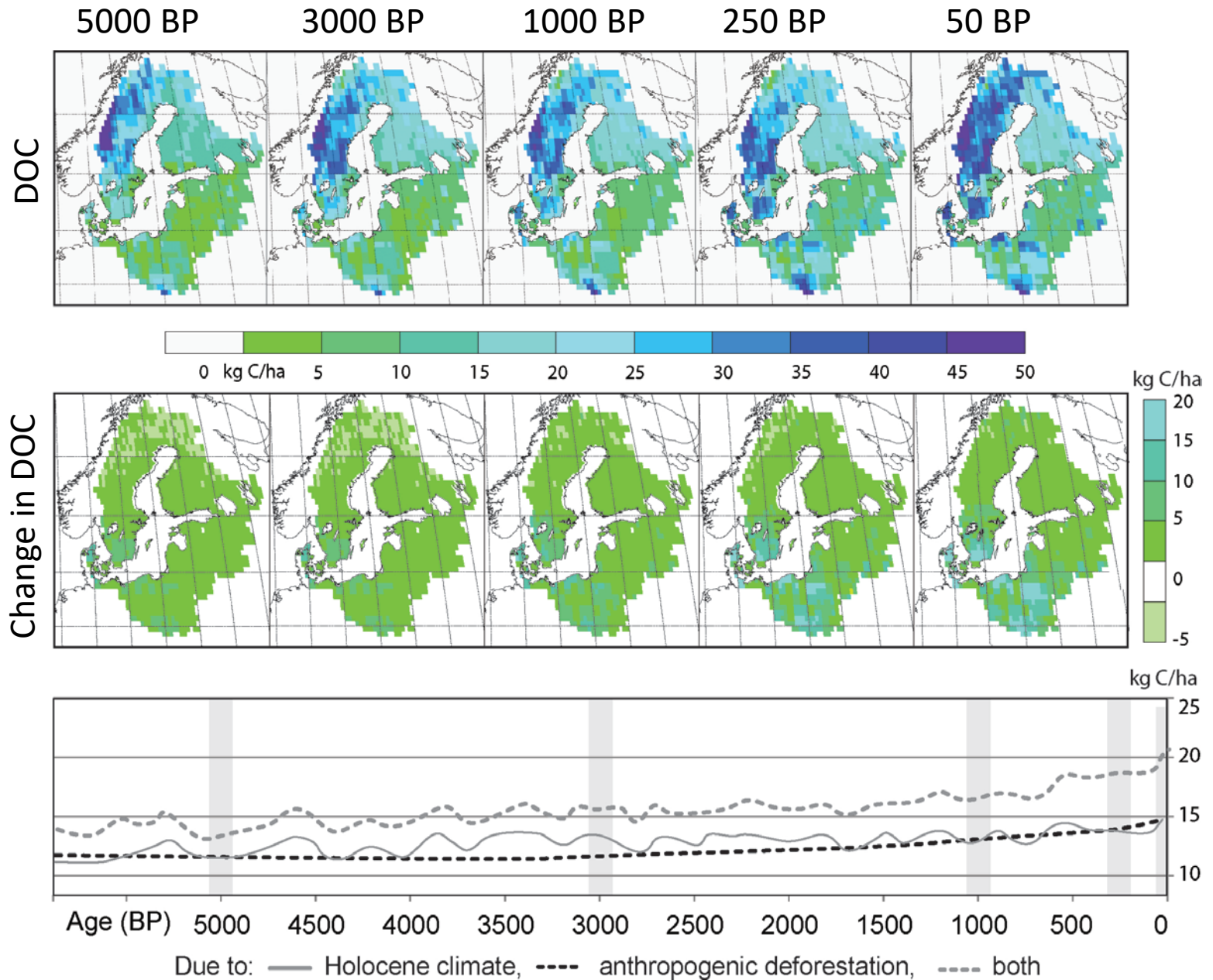
Change in terrestrial organic carbon (TOC) pool due to anthropogenic deforestation



Change in runoff due to anthropogenic deforestation



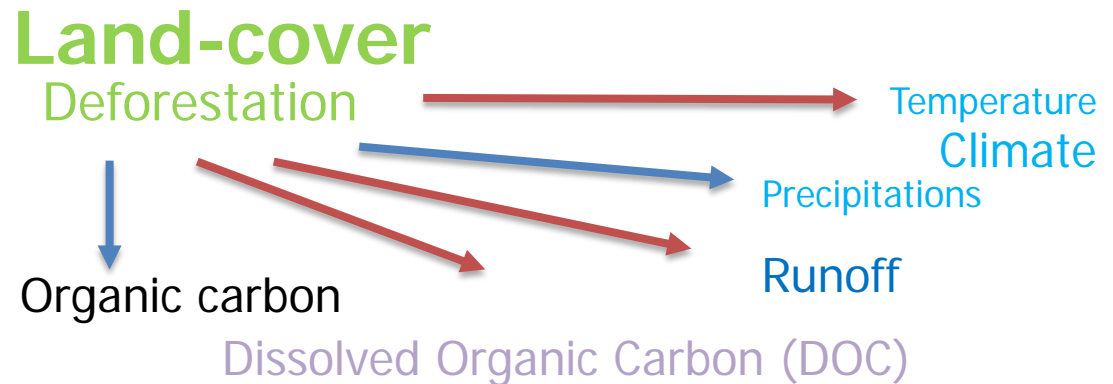
Change in DOC export due to anthropogenic deforestation



Conclusions

Land-cover change due to anthropogenic deforestation leads (and has led) to:

- considerable temperature and precipitation changes at regional scale. The magnitude of such changes is well comparable with ones expected due to usage of fossil fuels.
- decrease in organic carbon pools, BUT also to increased runoff and DOC export from terrestrial systems.



Thank you!

Thank you to:

- FORMAS & Estonian Research Council
- The LANDCLIM and LandCover6k networks
- BECC Action Group on Land-Sea-Human- Interactions

