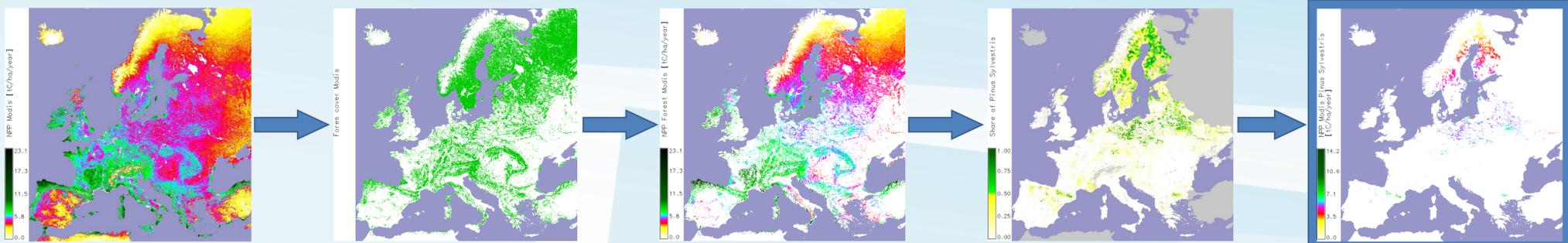
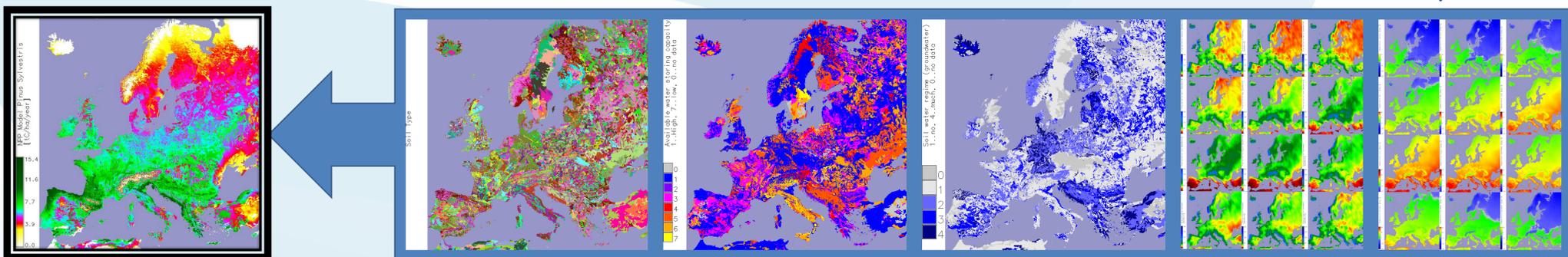


## Get Net Primary Productivity of a specific tree species



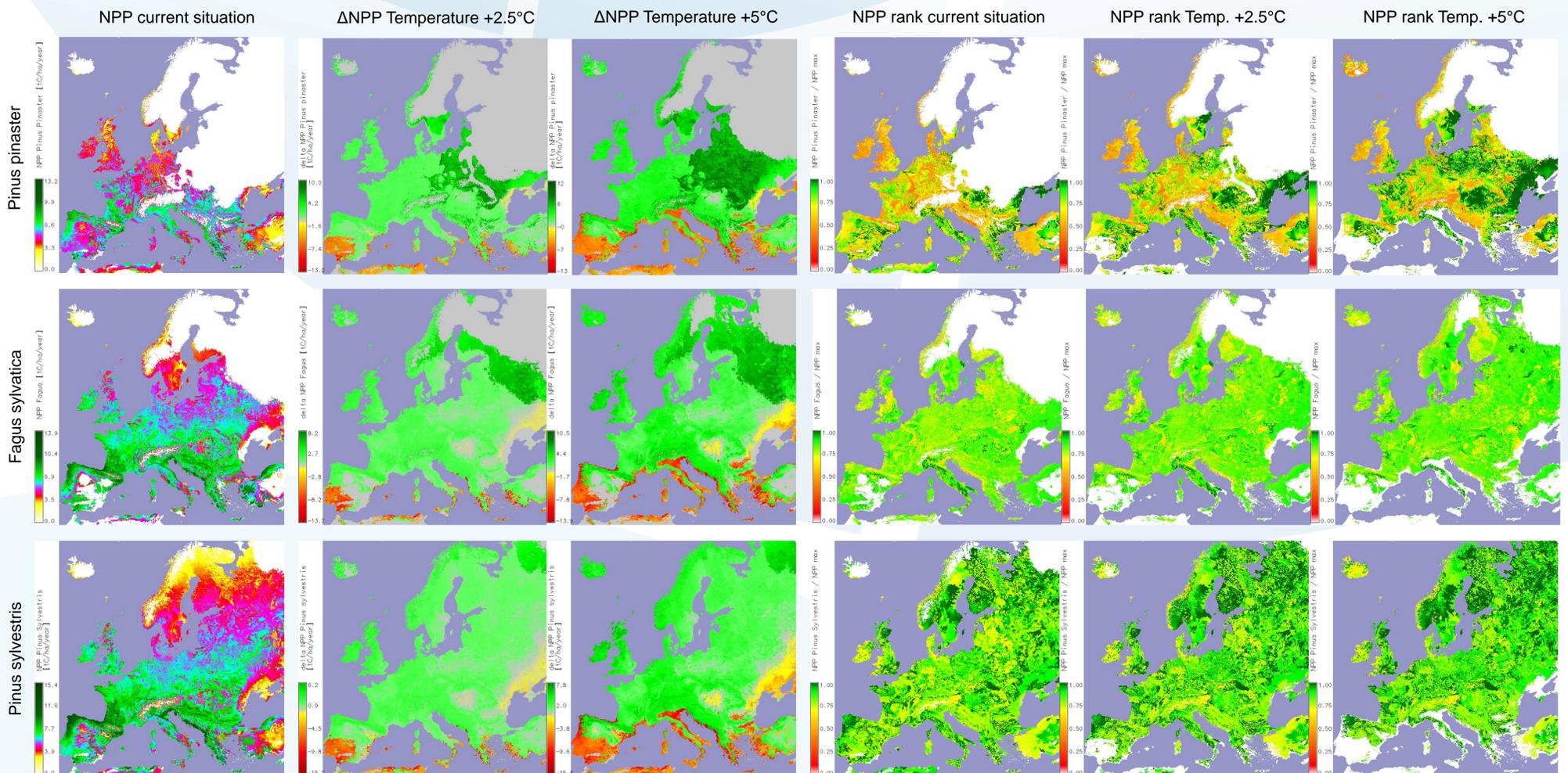
Taking Modis Net Primary Productivity (NPP) values and selecting the grids which are indicated to be covered by forest will produce a map showing the NPP of forest. Taking from the forest NPP map those grids which are dominated by a tree species (in the example *Pinus sylvestris*) will give a map showing the NPP of this tree species.

## Estimate Net Primary Productivity by using site specific predictors



Using the NPP of a species and describe the observed values with Soil Type, Available water storing capacity, Soil water regime, monthly Precipitation and monthly Temperature by creating a species specific model. With this model the NPP of any grid point can be estimated independent if this species is currently located there.

## Changes in Productivity and relative ranking due to increased temperature



The maps on the left side show the NPP estimates under the current site conditions for *Pinus pinaster* (Maritime Pine) which is limited to warm regions, *Fagus sylvatica* (Beech) which is limited to the central regions and *Pinus sylvestris* (Scots pine) which can grow in most regions of Europe. By grid-wise comparing the productivity of all examined species (*Abies*, *Betula*, *Fagus*, *Picea*, *Pinus pinaster*, *Pinus sylvestris* and *Quercus*), which is done in the figures showing the NPP rank, it can be observed that *Pinus pinaster* belongs in most regions which are suitable to the low productive species. Only in some small areas it belongs to the species with the highest productivity. *Fagus* belongs in most of the regions to the species with average and *Pinus sylvestris* to those with average to high productivity.

Increasing the temperature by 2.5°C or 5°C shows in most of the regions in Europe for all species higher productivity rates. Only in the southern parts and in the flat lands of Hungary the productivity is decreasing. The area suitable for growing is decreasing in the south for all species. On the other hand the potential sites in the north eastern part could be expanded especially by *Pinus pinaster* and *Fagus sylvatica*. The increasing temperature does not change much of the relative productivity of *Fagus sylvatica* and *Pinus sylvestris* but it looks like that *Pinus pinaster* profits most of an increasing temperature. Where *Pinus pinaster* can expand its area it belongs many times to the most productive species.

Even if most of the regions in Europe might be profiting from a temperature increase by showing higher productivity rates, the circumstance, that large regions in the south, in Hungary and north of the Black Sea show a dramatic reduction of the productivity or even a degradation until the sites will not be suitable for trees, is alerting.