IPCC AR5

Impacts of climate change on Europe

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Main topics included in the *Europe* chapter

Principal themes in the chapter

- Infrastructure
  - Energy, insurance, transportation, tourism
  - Hazards (floods; mass movements)
- Agriculture, fisheries, forestry, biofuels
- Health and social welfare
- Environmental quality and biodiversity protection
  - Air pollution; Water quality; Soil quality
- Cross-sectoral adaptation; Risk management
  - Coastal zone management; Integrated water resource management; Disaster risk reduction
- Co-benefits of adaptation and mitigation

Highlights of major conclusions

Main conclusions - 1

- Climate change will increase the likelihood of systemic failures across European countries caused by extreme climate events affecting multiple sectors
- Sea level rise and increases in extreme rainfall are projected to further increase coastal and river flood risk in Europe and, without adaptive measures, will substantially increase flood damages
- Evidence across sectors and sub-regions confirm that there are limits to adaptation from physical, social, economic and technological factors

Main conclusions - 2

- The provision of ecosystem services is projected to decline across all service categories in response to climate change in Southern Europe and Alpine sub-regions
- Climate change is likely to increase cereal yields in Northern Europe but decrease yields in Southern Europe
- Climate change will increase irrigation needs but future irrigation will be constrained by reduced runoff, demand from other sectors, and by economic costs

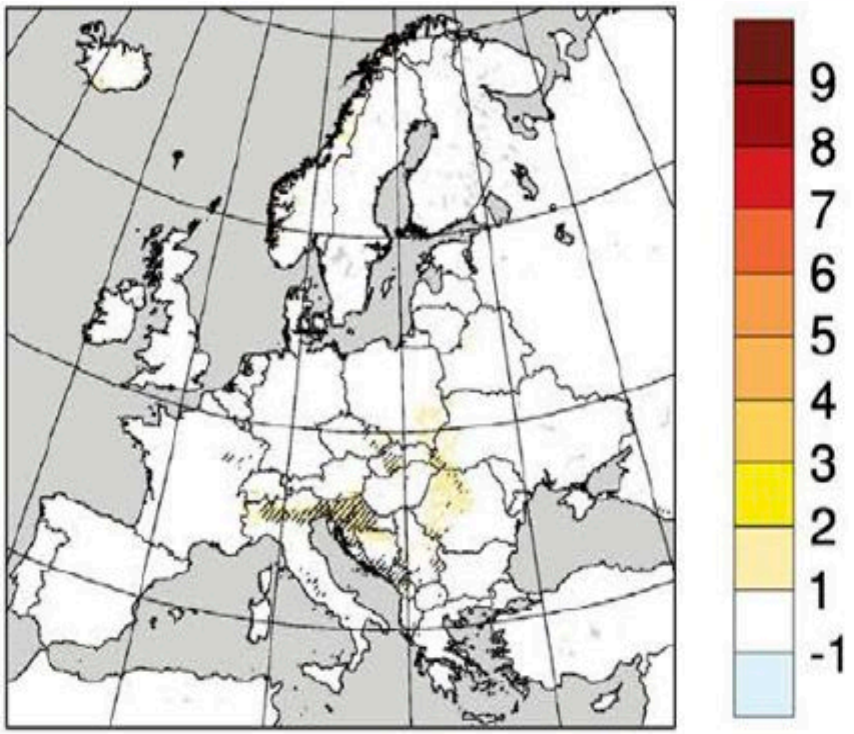
Main conclusions - 3

- Climate change is likely to affect human health in Europe
- Climate change is expected to affect future energy production and transmission
- After 2050, tourism activity is projected to decrease in southern Europe and increase in Northern and Continental Europe

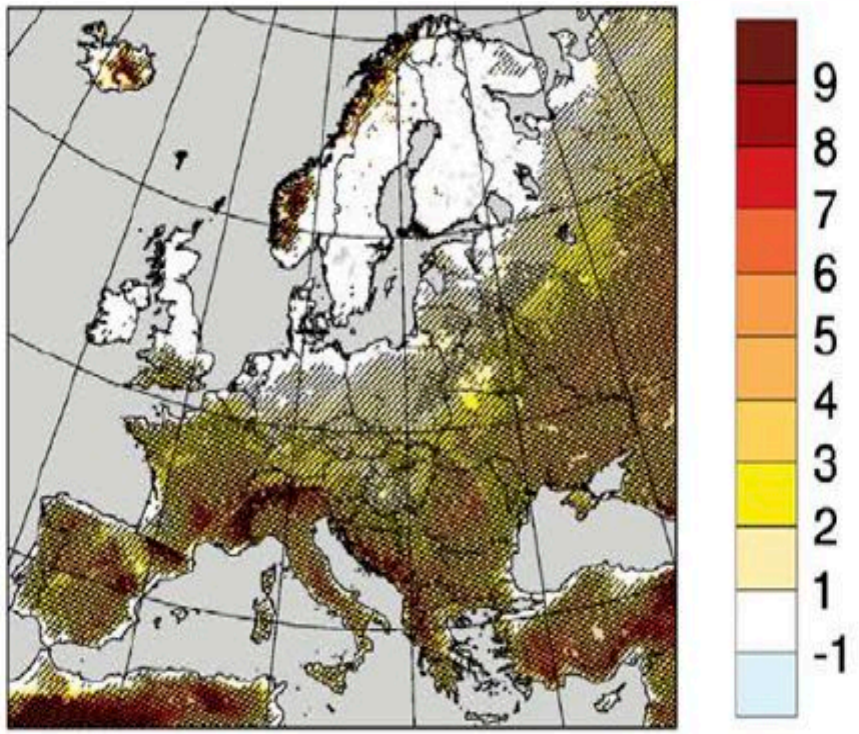
Extreme weather

Heat waves: changes in number of events (2071-2100 vs 1971-2000)

RCP4.5

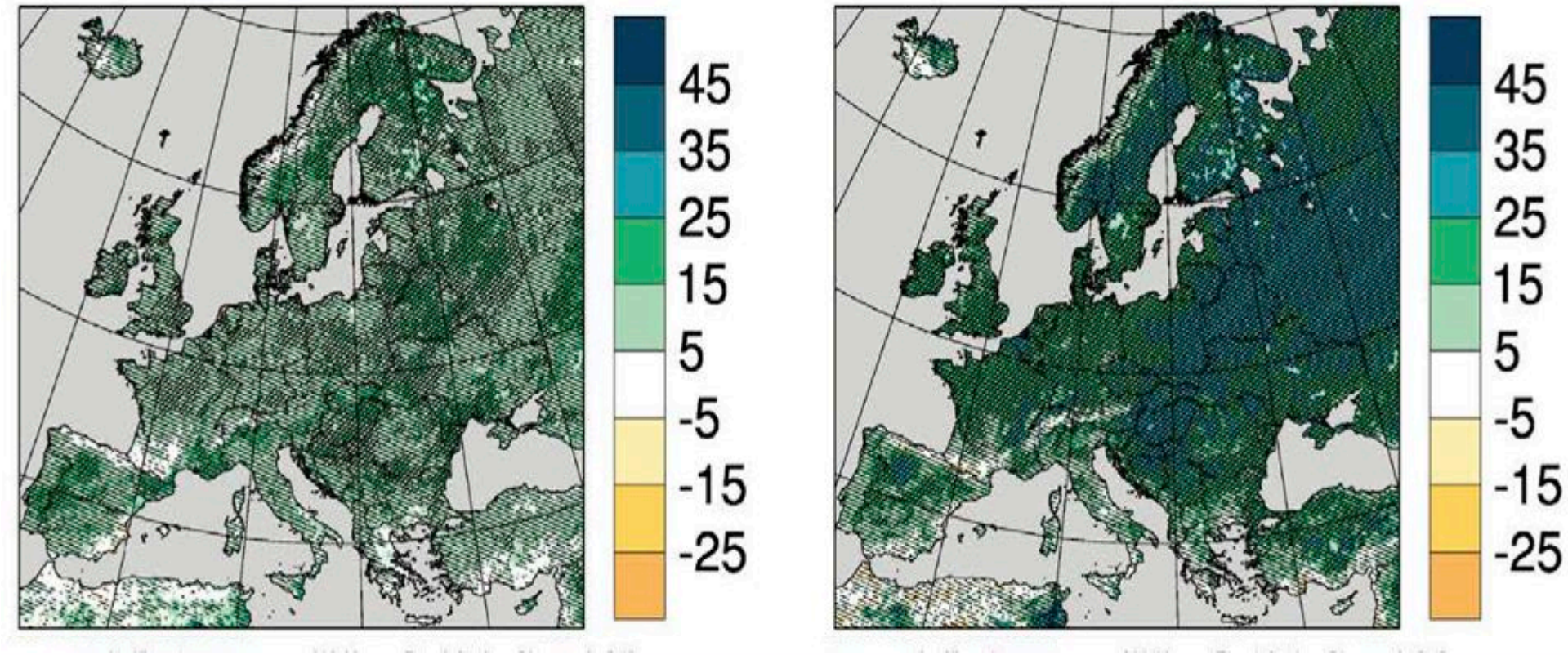


RCP8.5



Heavy rainfall: % changes
(2071-2100 vs 1971-2000)

RCP4.5 **DJF** **RCP8.5**



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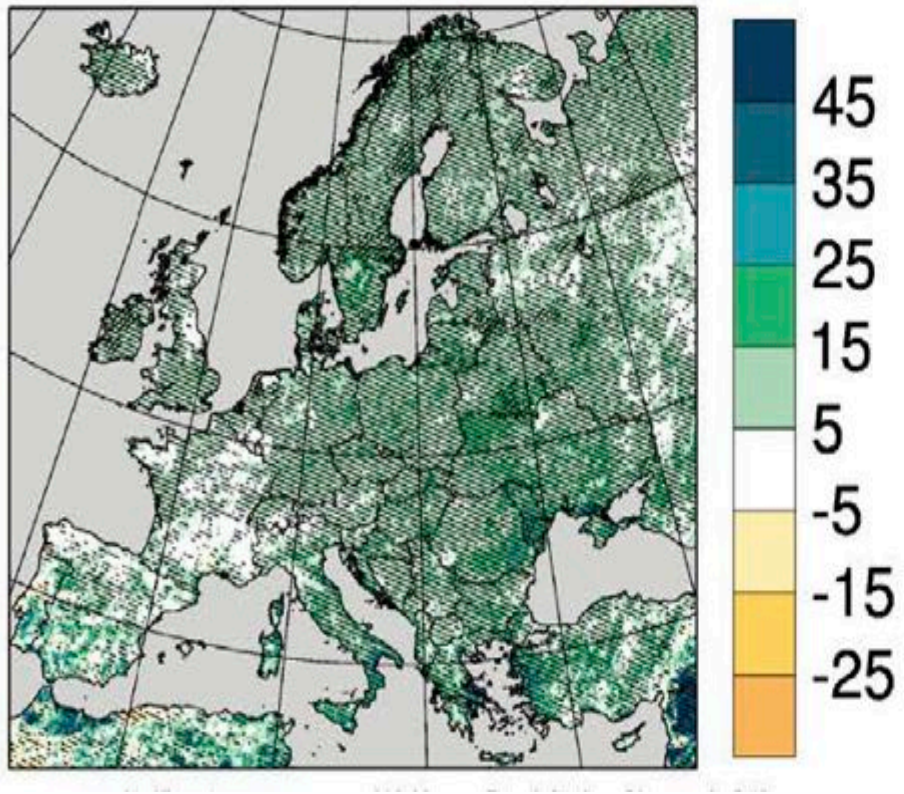
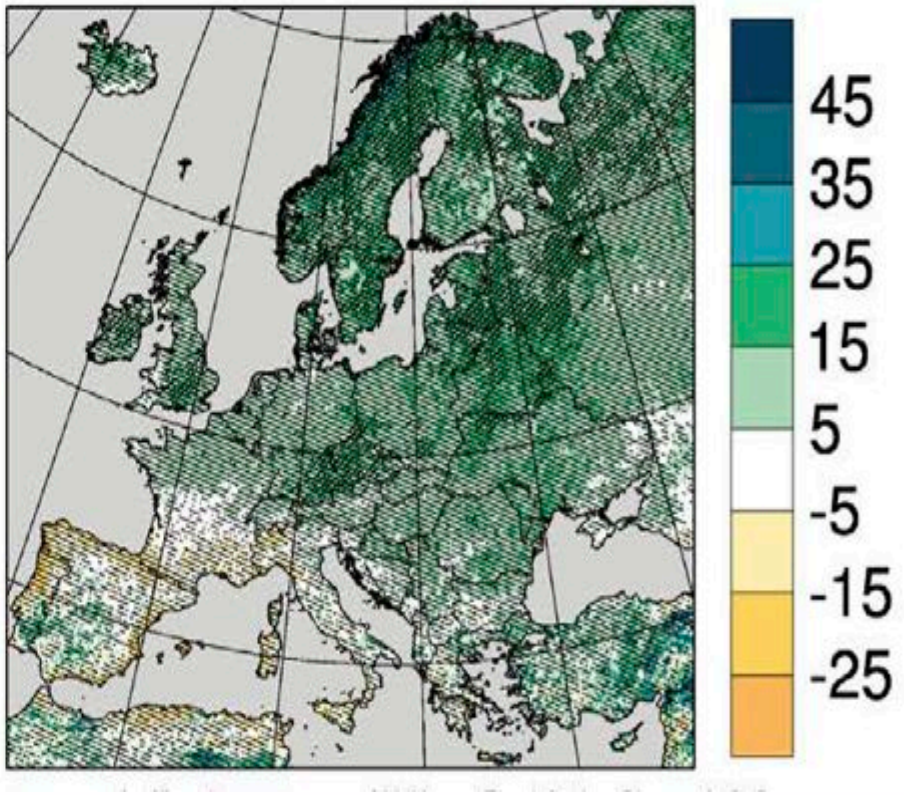
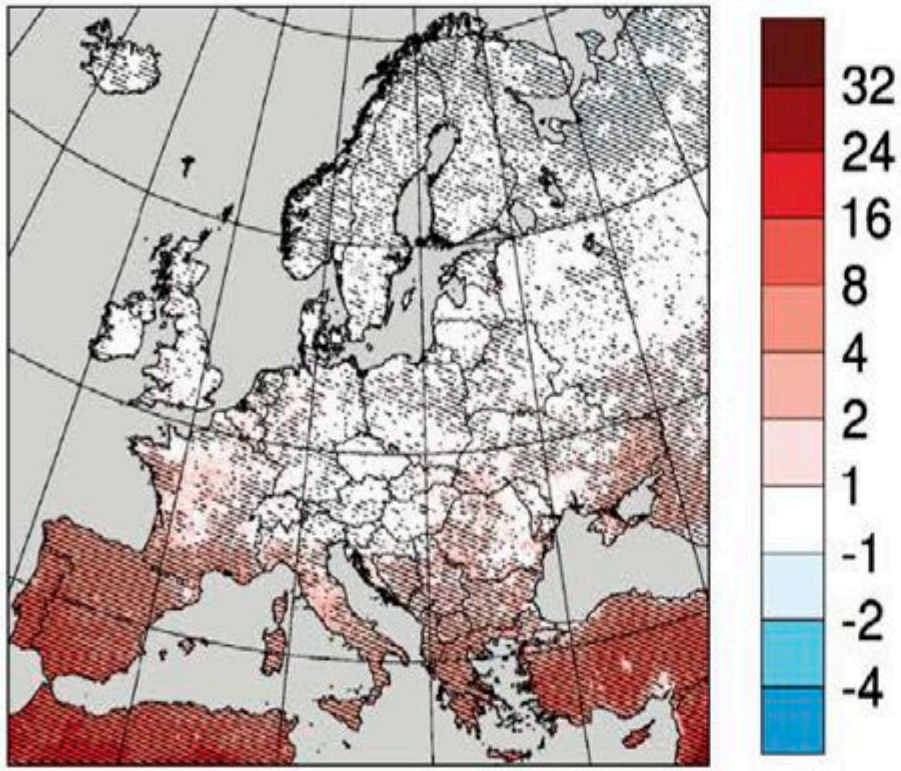


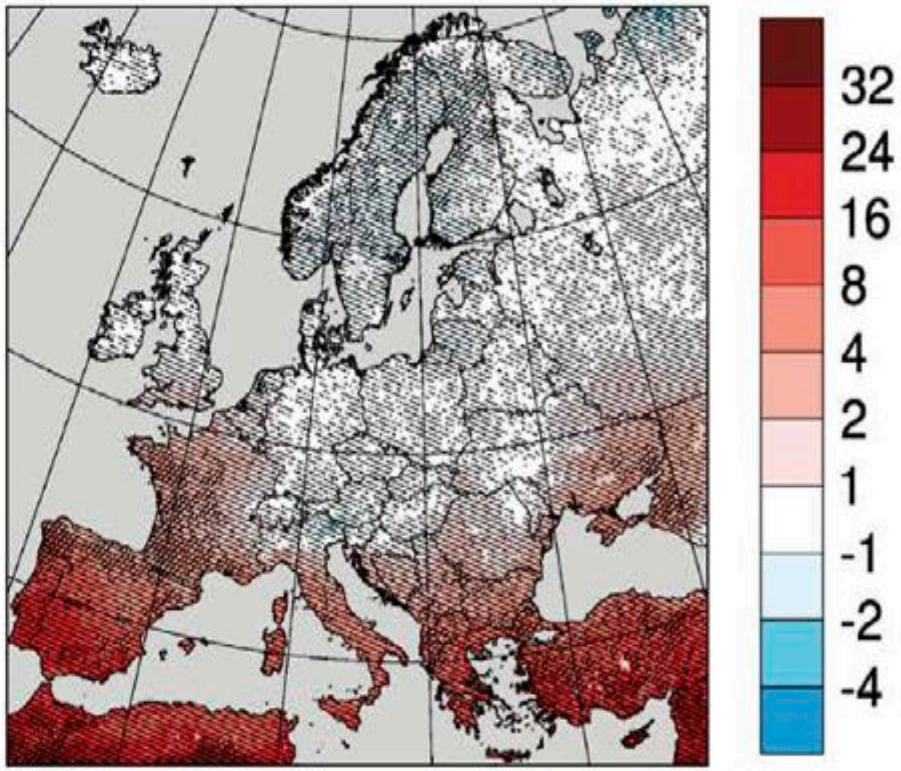


Dry spells: changes in 95% quantile (2071-2100 vs 1971-2000)

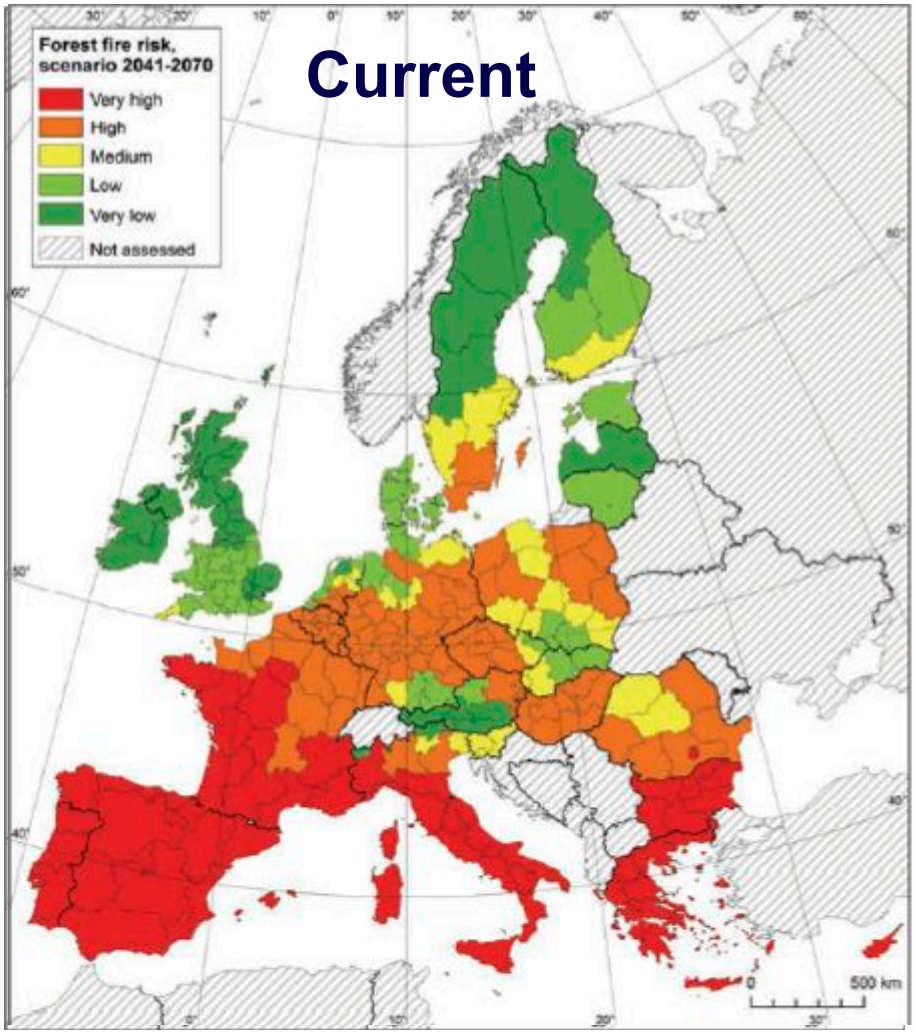
RCP4.5

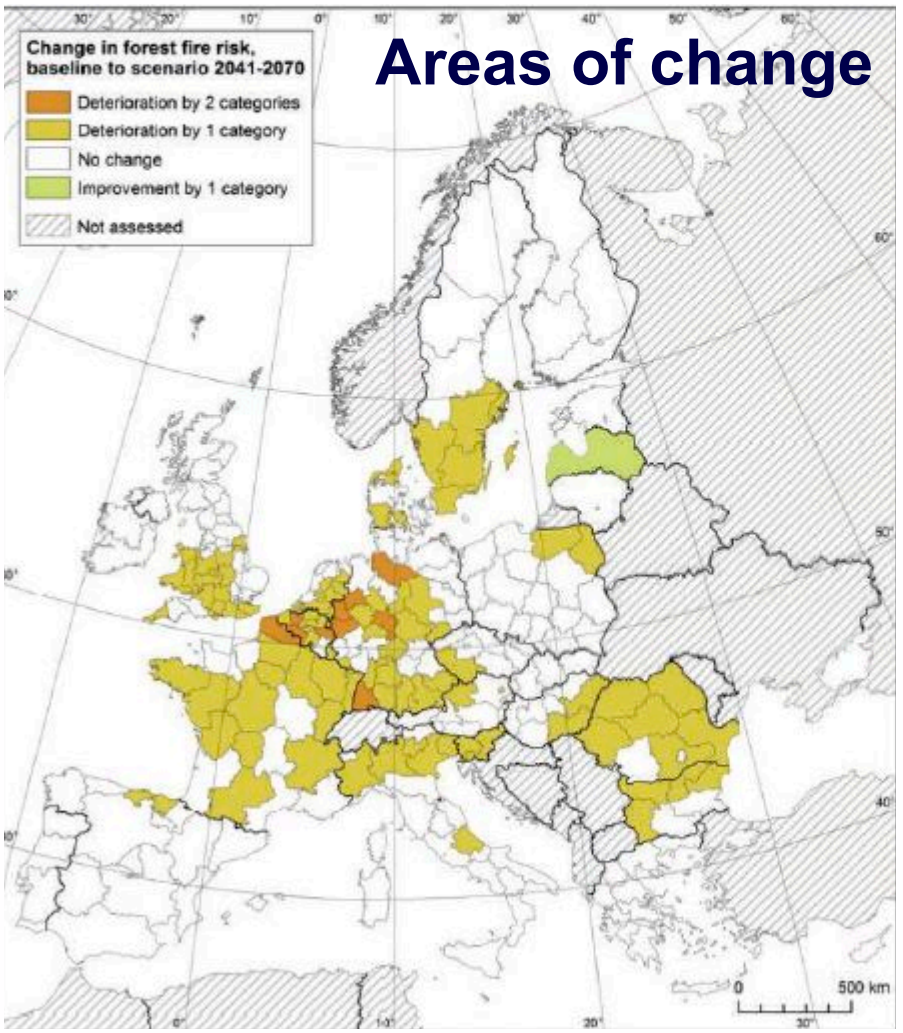


RCP8.5



Changing fire risk





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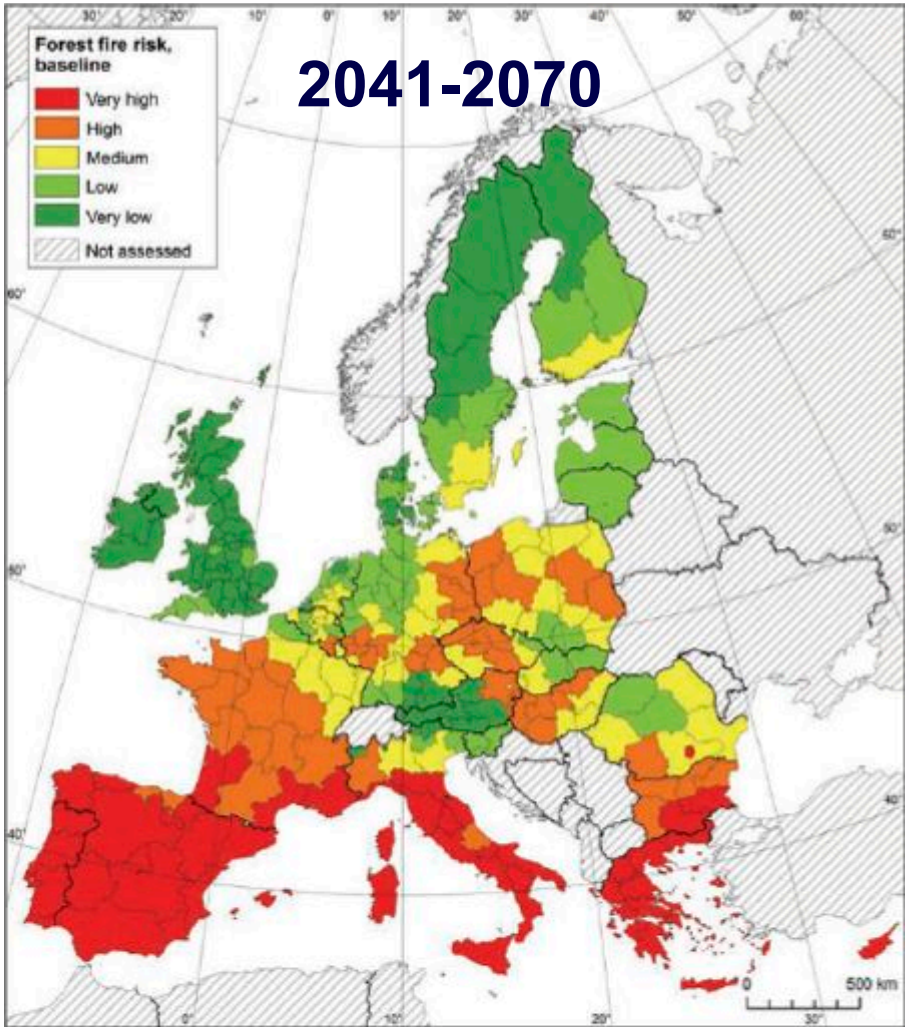
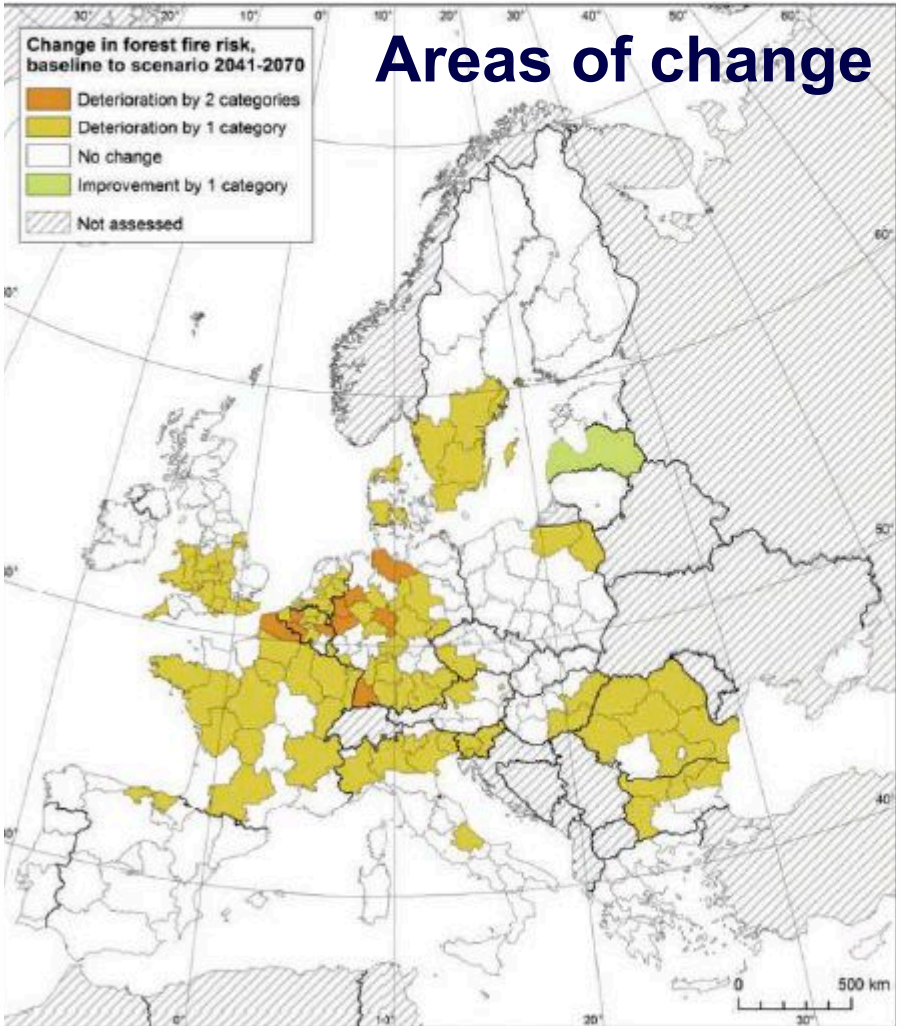
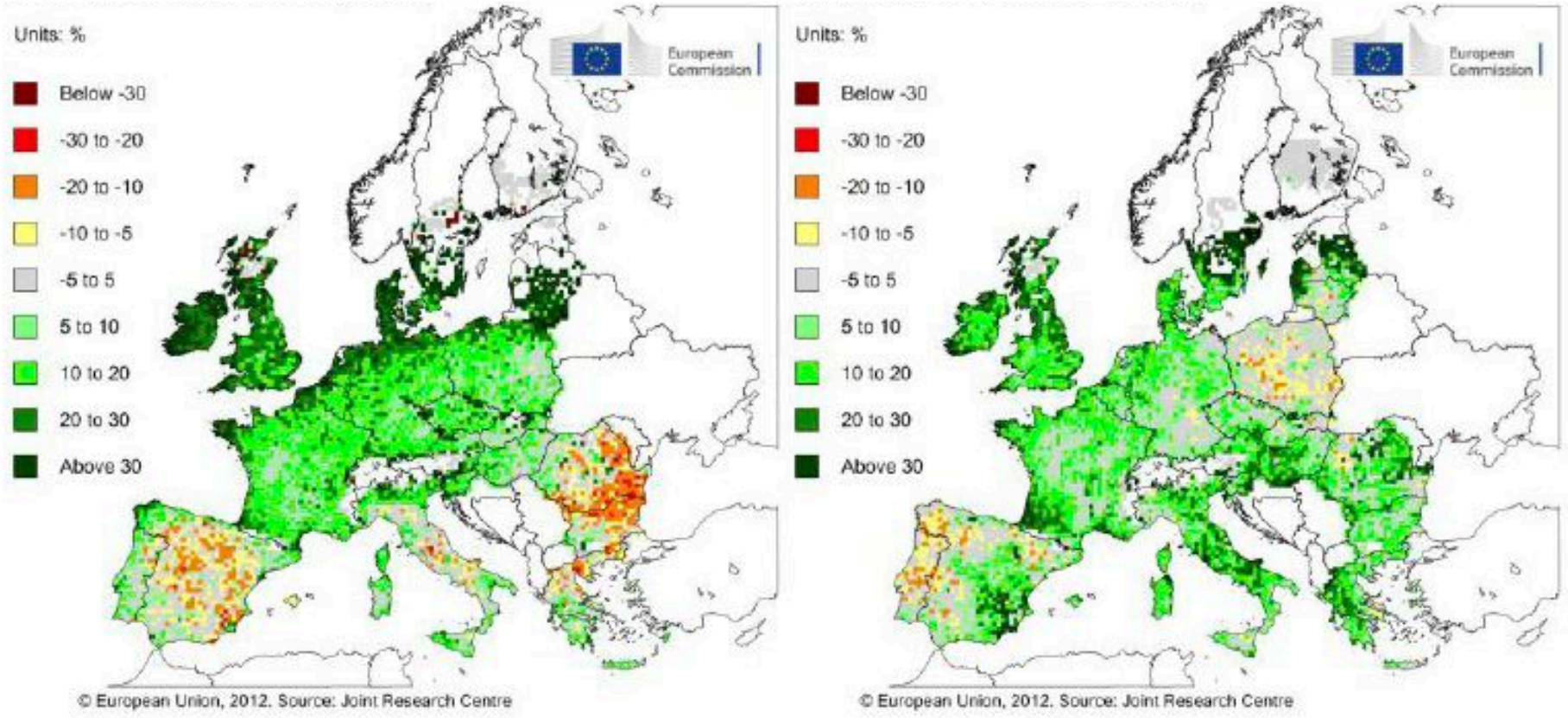




Water and agriculture

Change in water-limited yield for wheat, 2030 vs 2000

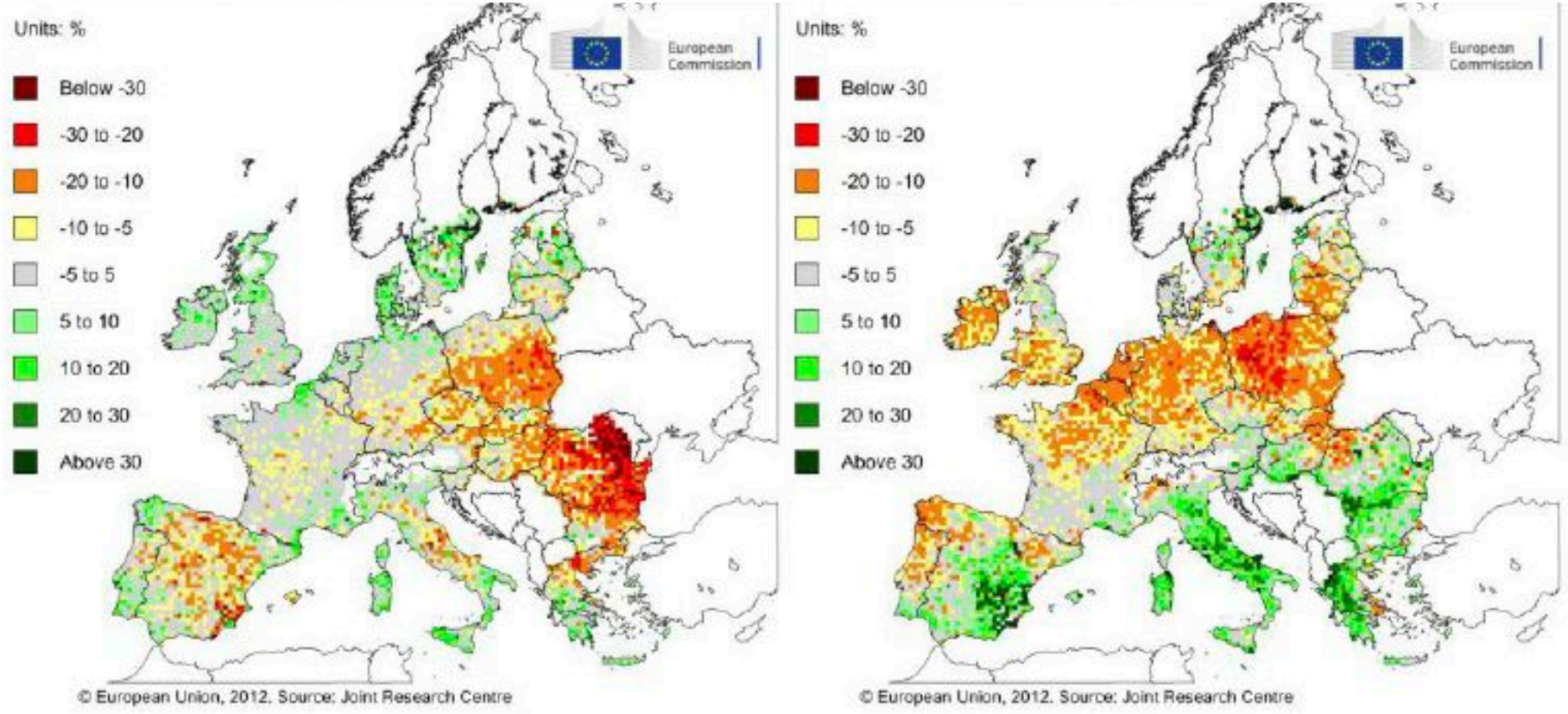
ECHAM5 **HadCM3**



With adaptation

Change in water-limited yield for wheat, 2030 vs 2000

ECHAM5 **HadCM3**



Without adaptation

Adaptive capacity

Conclusions regarding adaptation

- Adaptive capacity in Europe is high compared to other world regions, but important differences in impacts and in response capacity between and within the European sub-regions will occur
- Some impacts will be unavoidable due to physical, technological, social, economic or political limits
- The costs of adapting buildings and upgrading flood defenses increase under all scenarios relative to no climate change
- Opportunities and unintended consequences of policies, strategies and measures that address adaptation and/or mitigation goals may arise:
  - Some agricultural practices can reduce GHG emissions and also increase resilience of crops to temperature and rainfall variability
  - Low carbon policies in the transport and energy sectors to reduce consumption can lead to large benefits to human health

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MANY THANKS FOR YOUR ATTENTION

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