Climate Modeling

December 1, 2024

PRACTICAL REPORT

GLOBAL AND REGIONAL CLIMATE MODELS

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Contents

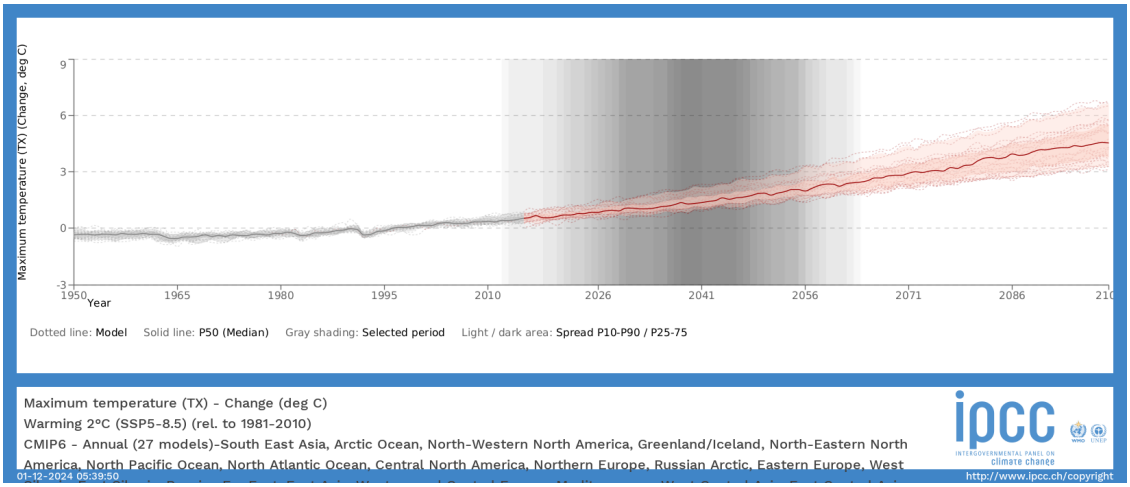
Interactive atlas

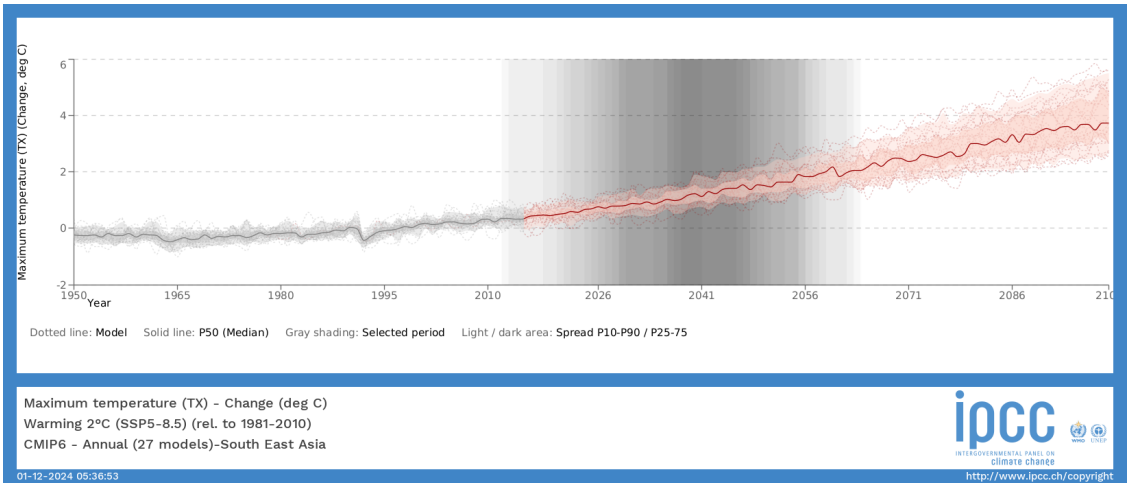
1 Plot the trends of past temperature and precipitation worldwide and in Southeast Asia and then provide comments on the results obtained

The solid line represents median and the dotted lines represent individual models. The gray shading represents the range of projections, with darker areas showing the period for which historical data was available and lighter areas is future projections.

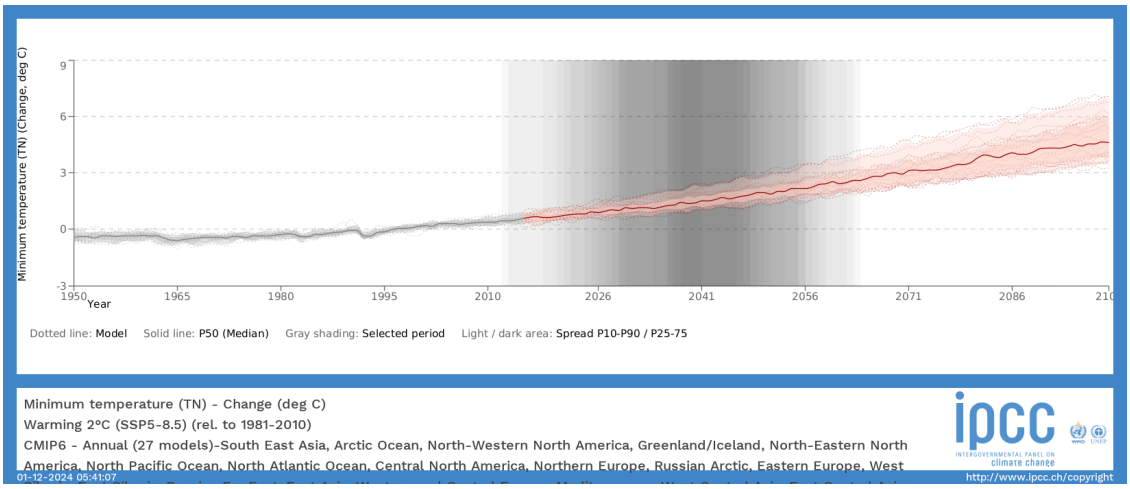
1.1 Temperature

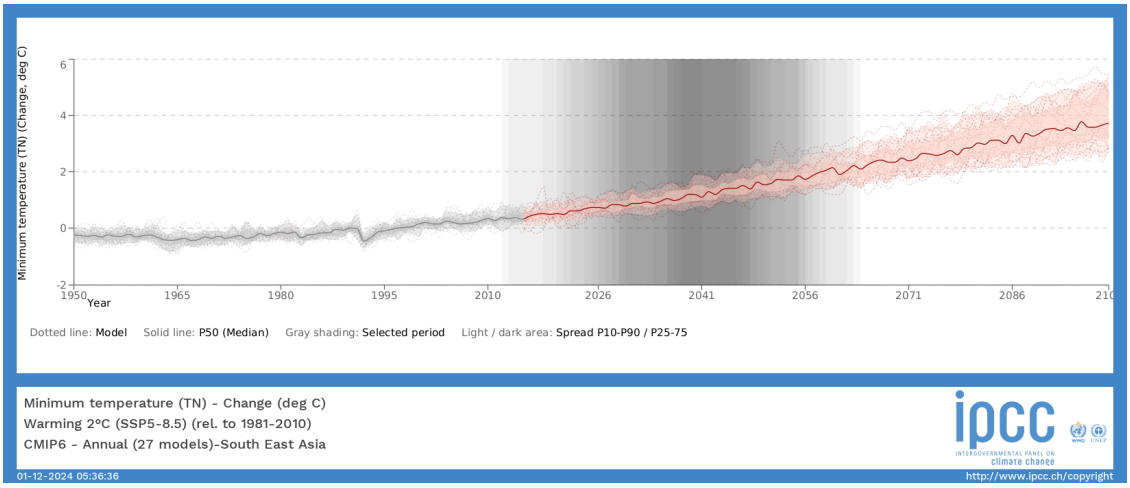
Maximum temperature



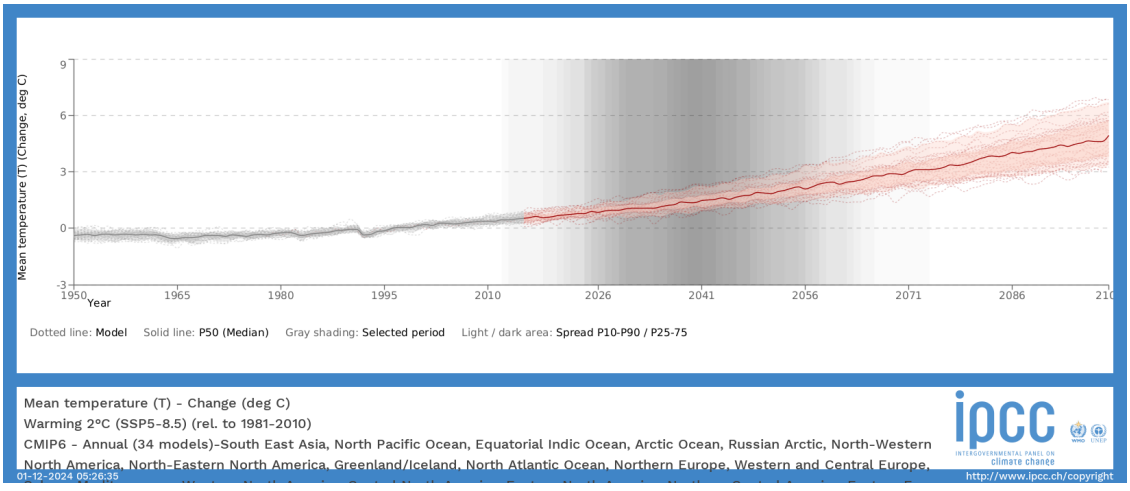


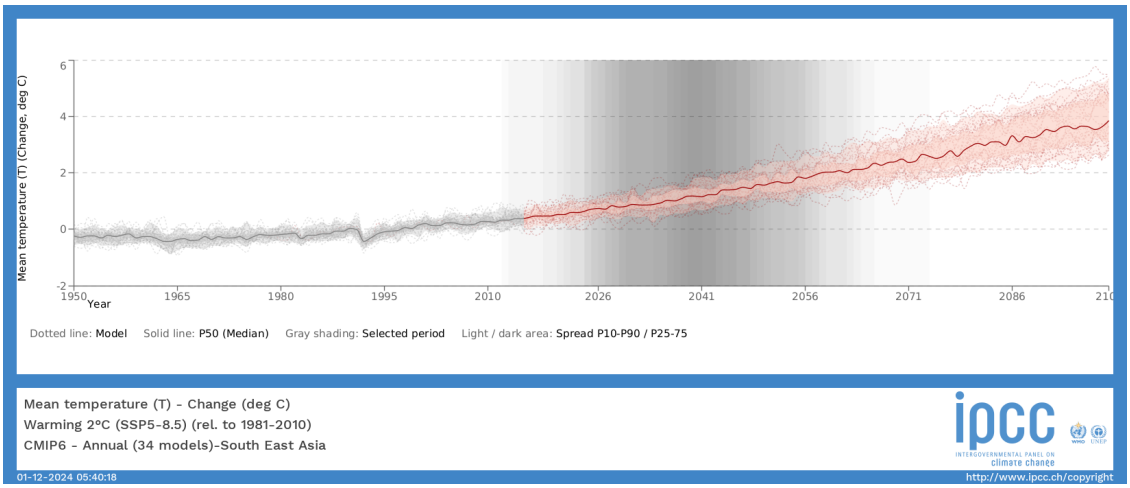
Minimum temperature





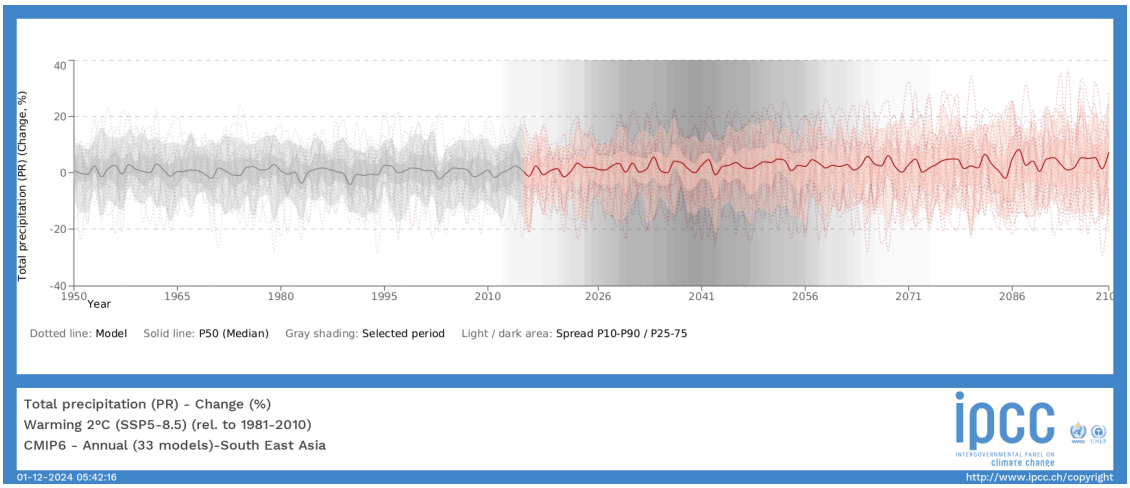
Mean temperature

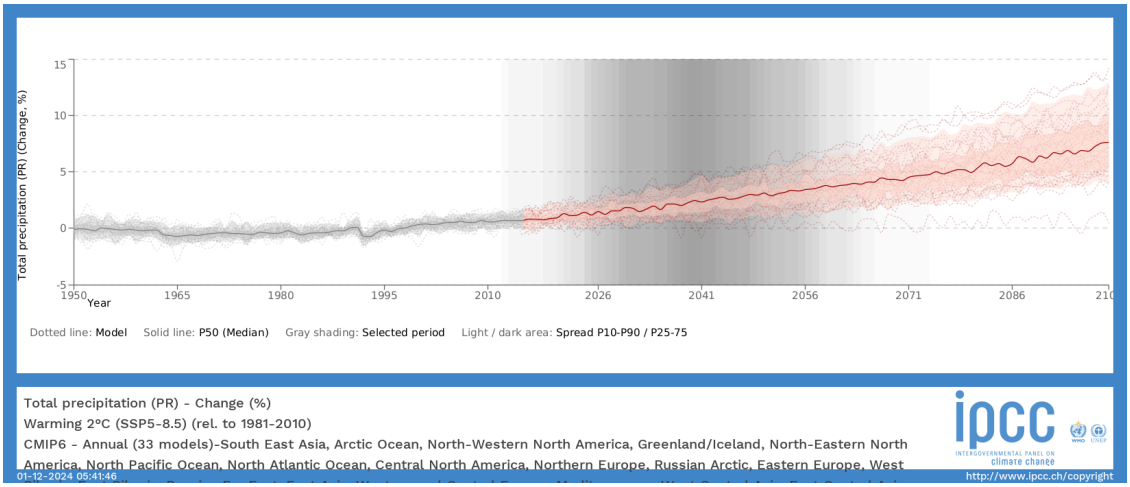




It can be seen that there is a rising temperature trend both worldwide and in Southeast Asia region. Globally, the temperature change value increased from below 0°C to about 7°C, and in Southeast Asia, it increased from below 0°C to nearly 6°C.

1.2 Precipitation

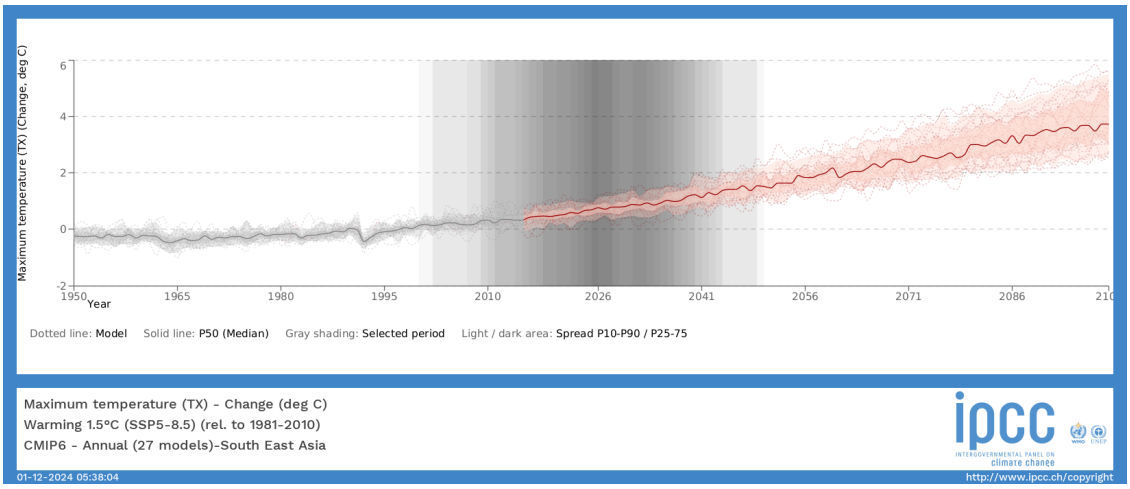


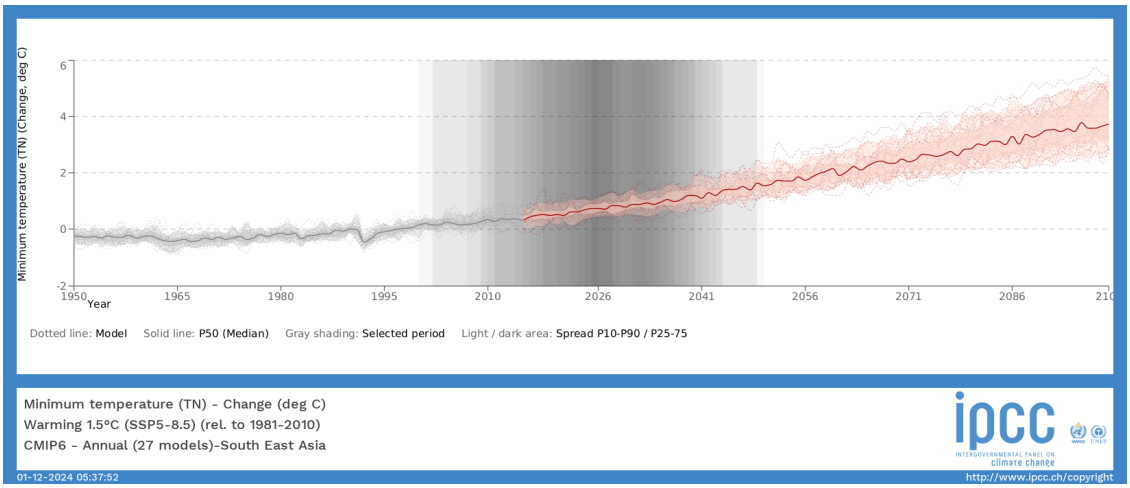


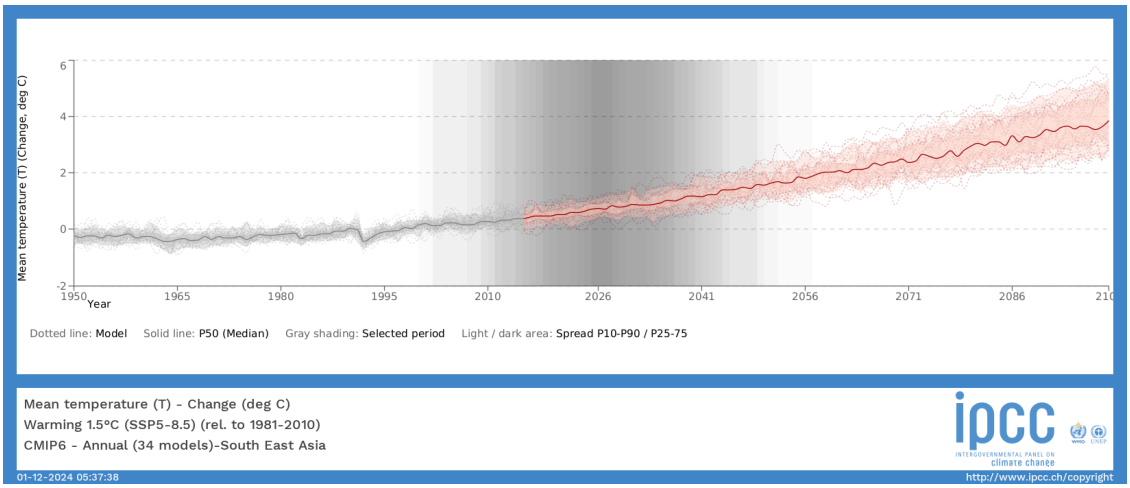
There is a lot of fluctuation in the Southeast Asia region, with the range of projections varying from -40 to 40%. Globally, a rising trend can be seen.

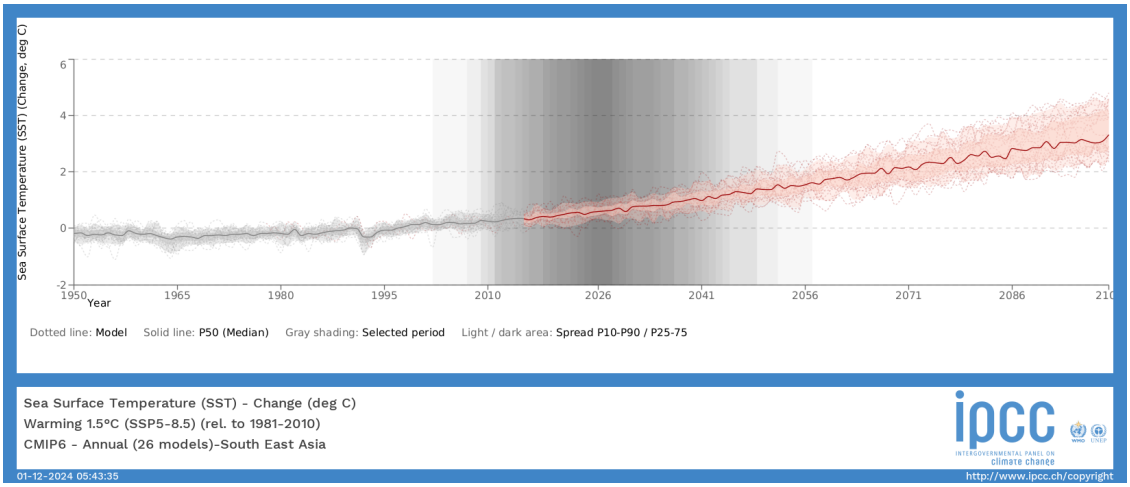
2 What should be the changes of specific variables in Southeast Asia under the 1.5ºC global warming level?

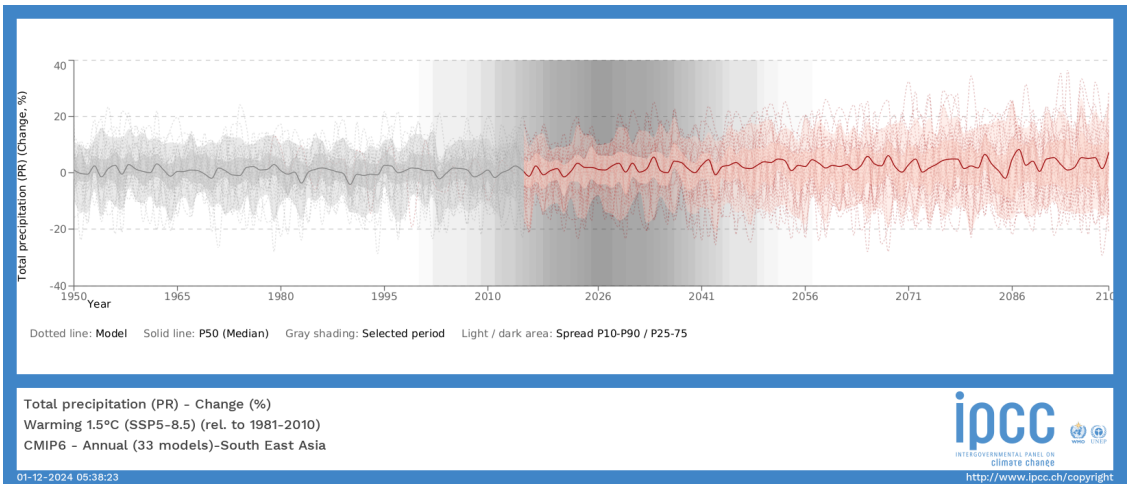
Change the global warming scenario from 2ºC to 1.5ºC.







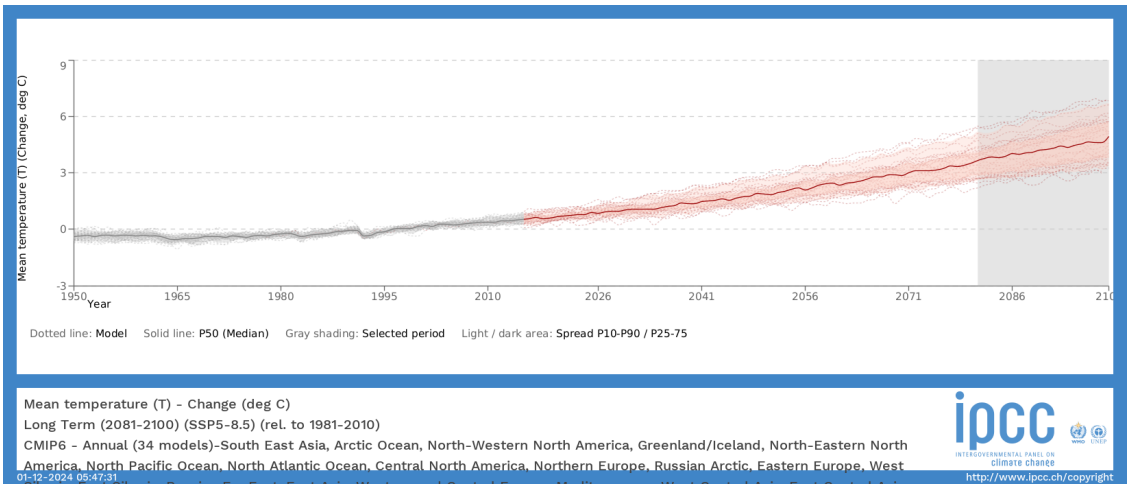


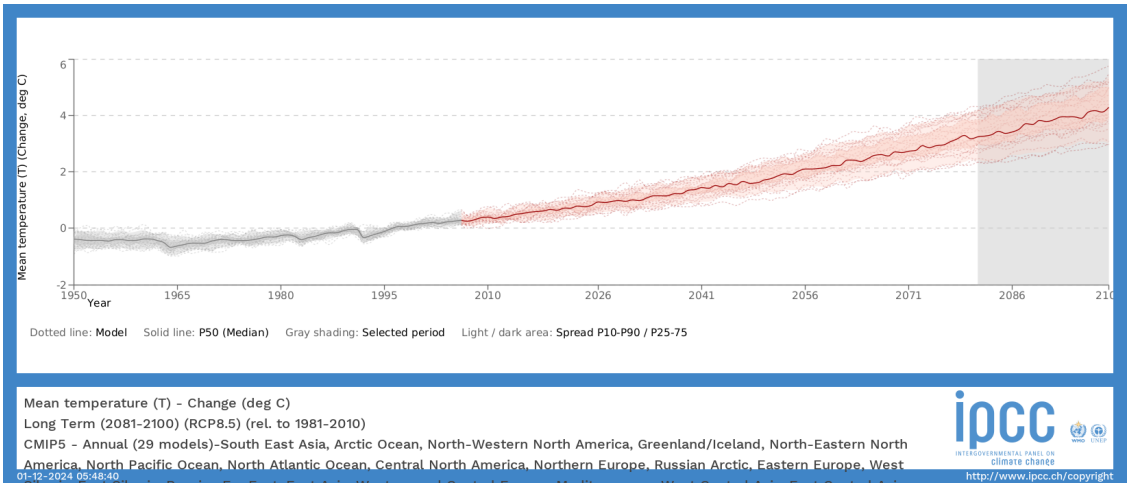


It can be seen that all temperature models indicate a warming trend. The changes in precipitation model are variable, indicating how complicated it is to forecast rainfall patterns. The range of predictions is quite broad, which is because of rainfall's high natural variability.

3 Provide comments on the changes in rainfall and temperature at the end-century (2081–2100) compared to the baseline period under CMIP6 SSP5-8.5 and CMIP5 RCP8.5

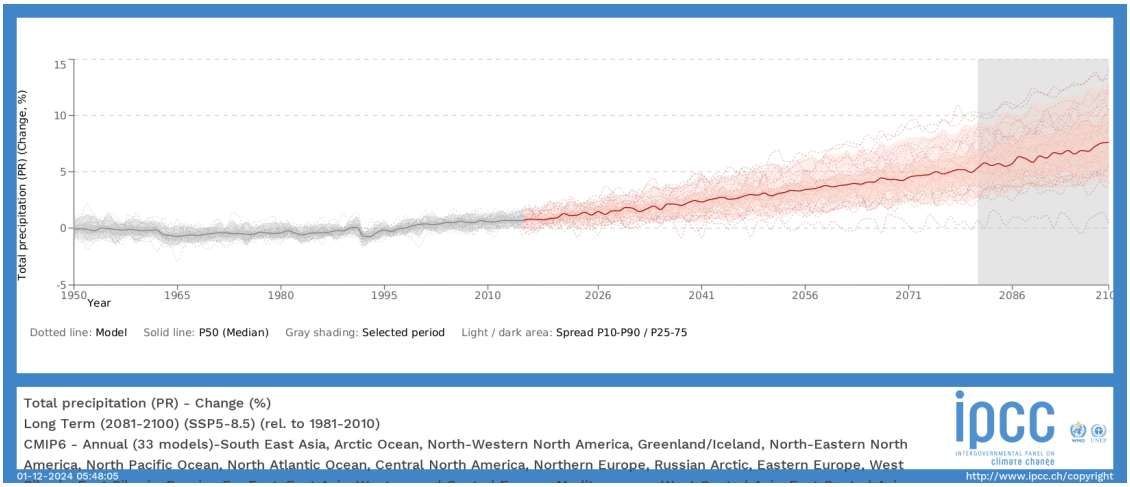
3.1 Temperature

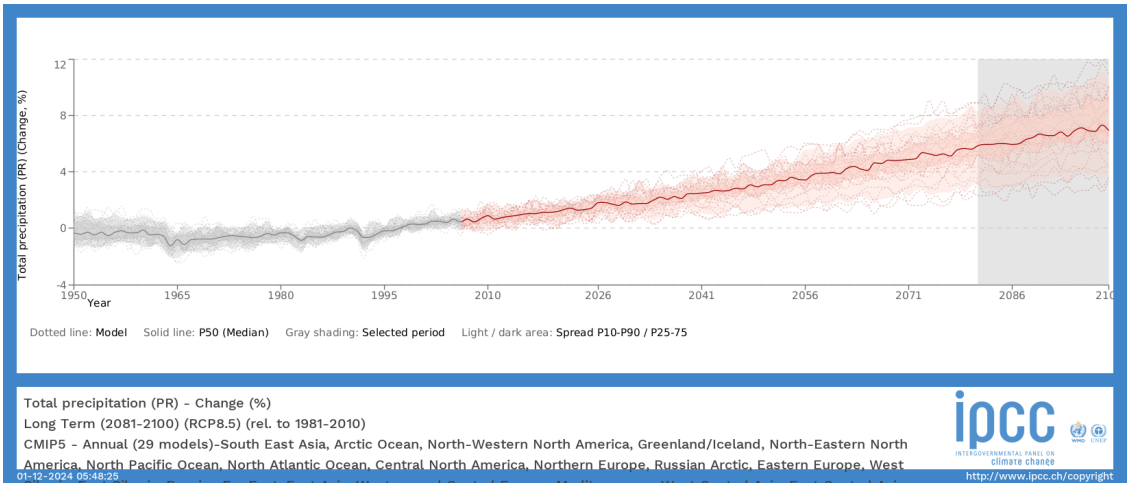




Both CMIP6 and CMIP5 indicate a significantly rising mean temperature towards the end of the century. The SSP5-8.5 scenario shows higher temperature change.

3.2 Precipitation





The overall trend for precipitation at the end of centruy is also increasing.

4 Conclusion

The steady rise in temperature across all scenarios and regions shows the effects of global warming. These temperature increases will impact ecosystems, human health, agriculture, and the occurrence of extreme weather events. The data also reveal differences in how climate change affects temperature and rainfall in different areas. For example, some regions may see more noticeable changes in rainfall patterns than compared to others and worldwide. The range of model predictions, especially for rainfall, shows the uncertainty in forecasting future climate conditions. Still, the warming trend is clear and strong across all models and scenarios.

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