Mitigation strategy under uncertainty and learning on climate sensitivity and damages

Dr. Tommi Ekholm, VTT Technical Research Centre of Finland

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Cost-benefit analyses on climate change mitigation have faced considerable difficulties, particularly due to uncertainties in climate sensitivity, valuation of climatic impacts and future mitigation costs, and also the inconclusiveness on how future costs and benefits should be discounted.

The study I present maps optimal emission pathways under a wide range of plausible assumptions on these uncertain factors under a cost-benefit framework.

With most of the calculated cases, the optimal emission pathways fall between corresponding 1.5°C and 2°C pathways. Emissions above the 2°C pathway are supported only if future mitigation is deemed to be expensive and discount rate is above 3%; while aiming below the 1.5°C pathway would be optimal with low mitigation costs and 1% discount rate.

The results thus suggest that the 1.5-2°C target range of the Paris Agreement provides a robust policy guidance for the next decades' mitigation action under a wide range of plausible parameter choices.

The range of optimal emissions 2030 is very wide: from 23 to 53 Gt CO_2-eq, with a median at 40 Gt CO_2-eq. This range implies a notable emission gap relative to Parties' current NDC targets.