Simulate Shared Socioeconomic Pathways (SSPs) by Using DICE

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Abstract

The objective of this study is to assess the optimal levels of climate change mitigation and adaptation by considering possible future socio-economic development (SSPs) and different climate targets defined as radiative forcing levels by an economic growth model - DICE. How the climate change mitigation and adaptation influence carbon price, climate change costs, GDP, atmospheric carbon concentration and radiative forcing; how much damage would be reduced if the optimal levels of mitigation and adaptation are achieved will be discussed. The results show that carbon concentration will shrink under mitigation options, comparing to the optimal adaptation scenarios; on the other hand, the adaptation will allow a relative level of emissions in order to reduce climate change costs, if there is no carbon emission limits; optimal cases which optimize both mitigation and adaptation levels has the lowest climate change costs. This study shows the possibility of assembling SSPs and climate change targets by using the optimal type of Integrated Assessment Models, and provides the implications for policy-makers to further understand how climate change mitigation and adaptation act under the potential future socio-economic development and possible range of radiative forcing.