Toward the Reduction of Radiative Forcing of Methane and Tropospheric Ozone: Aiming at the Emission Control of CH_4, $NO_x$and NMVOC in Asia

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In order to reduce impacts of climate change, including potential further increase of damages due to extreme events related to global warming, reduction of burdens of $CH_4$and tropospheric ozone in Asia are discussed. In order to mitigate the inevitable further increase of radiative forcing (RF) of ca. 0.8 W $m^{-2}$by 2040 caused by the increase of CO_2in 2040, feasible reduction of the industrial RF of methane (CH_4) and tropospheric ozone (trop-O_3) to the 50% of the values in 2011 are targeted to compensate 50% of the RF increase of CO_2. The remaining RF of $CH_4$and trop-O_3(0.26 and 0.22 W m^{-2}, respectively) correspond to the historical levels in 1960-1970. The necessary reductions of anthropogenic emissions of CH_4, $NO_x$and NMVOC in Asia in 2040 to the level of 1970 from that of 2010 have been estimated to be 35% CH_4, 44% NO_2, and 22% NMVOC from those of 2010 assuming the same necessary reduction ratio as for the global emissions. The estimated reductions have been compared with the reduction amount proposed in the Solution Report prepared under UN Environment Asia Pacific Office in 2018. The presumed reduction of the Asian emissions by 2030 through introducing of proven control measures are 27, 57 and 55% for CH_4 , $NO_x$and NMVOC. Thus, the reduction of RF of more than 50% from the reference year of 2010 is feasible for trop-O_3if the emissions of $NO_x$and NMVOC from other part of the world could be reduced coherently. Further efforts would be necessary for the reduction RF of $CH_4$by more than 50% of the present value.

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