Since the early 2010s, there appears an Asian aerosol dipole (AAD) pattern characterized by a continuous AA increase in South Asia (SA) and a concurrent AA decline in East Asia (EA). Examination of how the AAD pattern influences the climate is not only of interest from a scientific standpoint but also has critical societal and economic consequences. However, this remains largely unknown.

In this presentation, Dr. Xiang will introduce his work to understand the regional and global climate impacts due to the recent AAD pattern using a state-of-the-art GFDL climate model. In particular, Dr. Xiang will discuss why the climate responses are distinctly different between the SA aerosol increases and the EA aerosol decreases. A further quantification of the AAD-induced temperature change will be provided based on the observed instantaneous radiative forcing. These findings highlight the importance of the pattern effect of forcings in driving global climate and have important implications for decadal prediction.