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Do split and displacement sudden stratospheric warmings have different annular mode signatures?

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Sudden stratospheric warmings (SSWs) contribute to intraseasonal tropospheric forecasting skill due to their surface impacts. Recent studies suggest these impacts depend upon whether the polar vortex splits or is displaced during the SSW. We analyse the annular mode signatures of SSWs in a 1000 year IPSL-CM5A-LR simulation. Although small differences in the mean surface Northern Annular Mode (NAM) index following splits and displacements are found, the sign is not consistent for two independent SSW algorithms, and over 50 events are required to distinguish the responses. We use the winter-time correlation between extratropical lower stratospheric wind anomalies and the surface NAM index as a metric for two-way stratosphere-troposphere coupling, and find that the differences between splits and displacements, and between classification methodologies, can be simply understood in terms of their mean stratospheric wind anomalies. Predictability studies should therefore focus on understanding the factors that determine the persistence of these anomalies following SSWs.