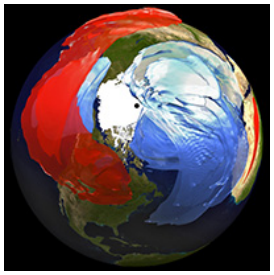

Contribution ID: **46** Type: **Poster presentation**

Real-time predictions of the 2019 New Year Stratospheric Sudden Warming in Multiple S2S Models

Using multiple data sources, favorable conditions for the 2019 New Year SSW event and its predictive skill from 11 sub-seasonal to seasonal (S2S) forecast models are explored in this study. This mixeddisplacement-type (displacement to split) SSW event occurred under moderate El Niño conditions in the Pacific, easterly quasi-biennial oscillation (QBO) winds, collaborated with solar cycle minimum, and phases 4-6 of the Madden-Julian oscillation (MJO). A strong positive PNA formed and developed in the troposphere before this SSW event, which is associated with enhanced and wave-1-dominated eddy heat flux, with wave-1 peaking in mid-to-high latitudes. The predictive limit to this SSW onsetcase is beyond 18 days in most S2S models, longer than the average predictive limit in existing literature. This high predictive skill may originate from the favorable initial conditions (QBO, MJO) and boundary conditions (moderate El Niño, solar minimum). Although some difference in the predictability of the 2019 New Year SSW onsetevent is found between models, most models well forecast its onset at a lead time of 18 days. More than 50% of the ensemble members initialized on 13 December forecast the zonal wind reversal, and the anomalyanomaly pattern correlation for troposphestratospheric heights during the real SSW onset days even exceeds 0.78 in the multi-most model ensemble (MME)s. In contrast, the predictability of the wave-3 and wave-2 pulses after the SSW onset, responsible for the standing split of the stratospheric polar vortex, is low in the forecast MMEs initialized before the SSW onset. It is a challenge for MMEs initialized before the SSW onset to well forecast the vortex splitting and its persistence 10-20 days after the SSW onset.extratropical heights in the troposphere is lower than in the stratosphere for all models, emphasizing the importance of the stratospheric conditions for prediction of SSW. Some models with a well resolving stratosphere still shows a higher SSW hit ratio and a larger anomaly pattern correlation than other models at a lead time of 25 days.

Primary authors: Dr RAO, Jian (Fredy & Nadine Herrmann Institute of Earth Sciences, The Hebrew University of Jerusalem); Prof. GARFINKEL, Chaim (Fredy & Nadine Herrmann Institute of Earth Sciences, The Hebrew University of Jerusalem)

Presenter: Dr RAO, Jian (Fredy & Nadine Herrmann Institute of Earth Sciences, The Hebrew University of Jerusalem)

Session Classification: Poster session

Track Classification: Workshop: Stratospheric predictability and impact on the troposphere