First studies of mesospheric momentum flux and wind fields using the SIMONe system over Patagonia

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During September of 2019, a state-of-the-art multistatic meteor radar system called SIMONe (Spread Spectrum Interferometric Multistatic meteor radar Observing Network) was installed in southern Patagonia, Argentina. Its main goal being the study of mesospheric waves in one of the (theoretically predicted) most dynamically active regions of the world. SIMONe Patagonia consists of 5 linearly polarized Yagi antennas in a pentagon configuration on transmission, and 5 dual-polarization single Yagi antennas on reception, situated between 30 and 270 km from the transmitters, which locate at 49.6° S. Combining measurements from the 5 links allows for more accurate estimations of mean winds and horizontal momentum flux for altitudes between 75 and 105 km. Furthermore, given the significantly higher amount of meteor detections, one can determine wind fields within the limits of the illuminated volume every 1 hour and 1 km in time and height, respectively. Preliminary results indicate a dominant semidiurnal oscillation in both the zonal and meridional wind components, as well as an enhanced and sustained (in time) gravity wave activity, especially above 90 km of altitude. In addition, momentum flux analysis reveals that the gravity wave activity is stronger than in other parts of the Southern Hemisphere, confirming that Patagonia is indeed a very active region at mesospheric heights.