**WORLD METEOROLOGICAL ORGANIZATION**
**WMO TECHNICAL CONFERENCE ON METEOROLOGICAL AND ENVIRONMENTAL INSTRUMENTS AND METHODS OF OBSERVATION**
***Towards fit-for-purpose environmental measurements***
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## SUBMITTED ABSTRACT

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| **0.** | **Paper Number** | 50 |
| | **Session Name** | 1. Characterization and standardization of environmental measurements - traceability assurance |
| **1.** | **Title of the paper** | ASSESSMENT OF PROPAGATION EFFECTS AND RADAR DATA QUALITY WITH A DUAL-POL TARGET SIMULATOR DURING THE OLYMPIC WINTER GAMES |



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| **4.** | **Abstract of the paper** |
| | A target simulator is an instrument that receives radar pulses and retransmits them with a pre-defined amplitude, time delay and Doppler shift in order generate a virtual radar target. By accurately controlling the properties of the pulse that is sent back to the radar, the generated target can be used as a calibration reference for a wealth of radar parameters, such as the radar constant and the differential reflectivity offset. During the Olympic Winter Games in PyeongChang, the world's first dual-polarization X-band radar target simulator has been employed for seperate experiments with two different dual-polarization weather radars. First, the differential and absolute calibration has been evaluated by generating a virtual radar target at 90 km distance to the radar. This target was repeatedly scanned and subsequently the measured radar reflectivity was compared to the pre-defined target properties. The horizontal radar channel could be corrected to an estimated accuracy of 1 dB while the vertical channel suffered from a hardware defect and hence could not be assessed. For a second experiment, the target simulator was installed for several weeks in 13 km distance to another dual-polarization weather radar. While the radar was located at an altitude close to sea level, the target simulator's altitude was approximately 700 m above. This set-up made not only possible the long-term assessment of the transmitter and receiver stability by evaluating clear-sky measurements, it also allowed the measurement of hydrometeor induced signal attenuation between the two instruments during precipitation events. Of special interest were cases, in which the melting layer was located between the altitudes of the two instruments in order to directly measure its attenuation. During one intense event not only melting layer attenuation could be directly measured but also precipitation induced phase changes on propagation. |