Evaluation of System PhiDP at Environment Canada's Research Radar

Norman Donaldson
Norman Donaldson, Environment Canada, King City, ON, Canada
Boodoo, Sudesh (Environment Canada, King City, Canada)
Hudak, David (Environment Canada, King City, Canada)
Stojanovic, Vlado (Environment Canada, King City, Canada)

E-mail: norman.donaldson@ec.gc.ca

At the Environment Canada's dual polarization C-band research radar in King City, the dual polarization differential phase measurement ("PhiDP") is used in attenuation corrections for Z and ZDR. These corrections require an estimate of the transmitted system differential phase ("SysPhi"), a quality not measured directly. We present and inter-compare a couple variations of methods to determine SysPhi from the radar observations of weather. There are weak but clear differences between the methods, which suggests that the SysPhi estimates are only accurate to about one degree.

In addition, over the last 4 years we have seen that the calculated SysPhi varies significantly in time. Some of these deviations seem to be correlated to deviations of temperatures measured at various locations in our system. We present a statistical study of the SysPhi estimates and temperature data. In 2013 the temperatures in the antenna mounted receiver were stabilized and the SysPhi excursions continued, which ruled this out as a source of the variability. There is a significant correlation of SysPhi to air temperature in the radome and antenna pedestal temperatures, present both in the raw data and in high passed data. The most significant excursions of SysPhi seem to correspond to temperature spikes inside the dome, but not always. It remains unclear whether the relation between temperature and SysPhi estimates is causal or both are correlated to some other factor.