

Review of *Sensitivity of GPS tropospheric estimates to mesoscale convective systems in West Africa*, by Nahmani, Bock and Guichard. ACP-2018/1242

General comments

This paper assesses the variation of GPS tropospheric estimates (ZWD, ZTD gradients and IWV) in connection with passages of meso scale convective systems (MCS) above and past a set of GPS sites in West Africa. It does so for two types of GPS data processing, network versus PPP.

It is demonstrated convincingly that indeed the GPS derived tropospheric estimates are sensitive to MCSs.

It is a concise, nicely written paper that I enjoyed reading. It can be published with only minor changes.

Specific comments

p 3: ECMWF pressures are used to determine ZHD. Why that when every site is equipped with meteorological sensors including a barometer?

p 5 top in connection with table 1: Consider using mm throughout. At first I got fooled not noticing cm being used for the constraint on the ZWD rate of variation in table 1.

p 7 bottom: .. the relative humidity -> ... the relative surface humidity

.. humidity increases again to reach a maximum of 76 % before the first rainfall. -> .. humidity starts rising again before the first rainfall, passing 76 % before it occurs.

p 8 around line 20: I was surprised not to see wind included in "best way to identify CPCT", but much later in the manuscript realised that possibly you don't have wind observations from all the sites. If so it would be good to give that as a reason wind is not included in your CPCT scheme.

p 8 around line 35: It is preferable to talk about convergence of air, not separate convergence of moisture. Low level convergence brings air to the column including additional humidity, and initiate a lift, which leads to cooling, saturation, latent heat release, etc.

p 11: Possibly observations of precipitation and lightning from ground, as well as of clouds and lightning from geostationary satellites can be added to the MCS detection arsenal?!

p 12: Are there some sunrise/sunset (which can also be associated with rapid warming/cooling) limitations to this method?

p 14 line 3: There is certainly a strong change in moisture levels associated with the passage of the MCS. But which part of that is due to convergence taking place in the neighborhood of the GPS site, and which part is just due to advection of an MCS that already contains large variations in humidity past the GPS site is less clear.

p 15, end of conclusion: Your study underlines the ability of PPP to provide high frequency estimates of ZWD and ZTD gradients, which is valuable for NWP (both for verification and assimilation) and meteorologists. Consider adding a few words on this in the discussion or the conclusion.

Figure 8 a: Is the variation of the Tm used when converting from ZWD to IWV really so little that the GAMIT curve for ZWD and the points for IWV can be placed precisely on top of one another?