The paper presents a nice overview of the detection of reflected signals in GPS radio occultation events and discusses the additional information that could be derived from such data, including potential benefits from using this information in NWP. It is well organized and readable, also covers some basics and appears to be complete. Further work is encouraged, showing the benefit in actual NWP applications.

All in all, the paper may be accepted for publication after addressing the following issues.

- Page 2, line 32: "However, at this very low elevation, a reflection does not lead to a reversal of the polarization, and the reflected signal is still right-handed. Although GPS receivers are designed to separate in most cases the different received components, either by polarization, through the Doppler shift, or by delay through PRN modulation, the specific case of the direct and reflected paths near the horizon appears as particularly challenging."

I think the authors want to express that, for given electromagnetic properties of the reflecting surface, amplitude and phase of the reflected signal may be calculated. In general, it is a superposition of (linear or) circular polarized waves. The authors are probably interested only in the case where the incident angle is larger than Brewster's angle (for water), although they mention e.g. CYGNSS and GEROS-ISS where this is not the case. Furthermore, a receiver needs some kind of "hardware assistance" (antennae) to be able to discriminate signal polarization.

Please rephrase to make the author's intentions better understandable, or shorten appropriately, as the polarization is not really important here.

- Section 2, page 5-6: L1 and L2 are explained, but not P(Y) or L2C.

- Page 8, line 5: "... as well some cases of non-reflective interaction with the surface, such as a mirage."

Is it really an interaction with the surface, rather than some layer above?

- Page 9, line 24-27: "These patterns, consistently associated with geographic and seasonal features, do not suggest a direct relationship with any instrumental problem or performance. They may, at most, be linked to instrumental performance issues if these arise under certain geophysical conditions related to seasons or geography."

Either there is a contradiction here, or I do not understand what the authors mean by "performance" and "issues". Also, is there some simulation of occultation events which helps to understand where there is the real problem? Does it have to be the "instrument", or another part of the chain linking the primary event to the data being seen by the user? Instead of speculation, why not suggesting appropriate studies?

Please reformulate.

- Page 9, line 31: ERA Interim is mentioned, but a reference is missing. Consult the ECMWF website for a proper citation.

Furthermore, it should be better explained also in the main text how the ERA data are used in the calculation of the correlations, not only in the caption of table 3. For variables that are single-level and that would be considered "slow", like sea-surface temperature, this may be unimportant, while it may be different for others which are spatially and temporally varying faster (like relative humidity). The reader might ask whether averaging over most of the troposphere significantly affects the

conclusions.

- Page 16, line 5 and page 36, fig. 11: misrepresentation of singularities

The kernel $K(r)$ in eq.(4) has an integrable singularity at $nr=a$, not a
"narrow peak", it is smooth for $nr>a$, and it is undefined for $nr<a$. It is
a density that depends on the measure, and by a suitable change of variable
the singularity may be dealt with.

At the same time, fig.11, claiming to show K, shows several lines with some
inappropriate peak. This is wrong. Please check the manual of the
plotting tool used how to properly plot singular functions.

Both needs to be corrected.

- Page 29, caption of fig.4: it should probably read "SVM output value".
  Furthermore, "... events per pixel is small to perform statistics ..."
  should probably read "... too small to derive sensible statistics".

- Page 33, fig.8: What is the units of CWV?

Spelling etc.:

  Some cases which might have been found by a tool:

- Page 12, line 3: "contitute".

- Page 17, line 3: "direct direct"

- Page 18, line 17: "sensitivivity"