Review of "**Temperature profiling at the AmericanWAKE ExperimeNt (AWAKEN): methodology and uncertainty quantification**" by Letizia et al."

The manuscript provides an overview on temperature profiling from ground-based spectral infrared radiance observations using the rather novel ASSIST instrument and covers both, a comprehensive uncertainty analysis of the instrument itself and the TROPoe temperature profile retrieval algorithm, as well as the analysis of nearly one year of multi-site ASSIST temperature profiling during the AWAKEN campaign.

The manuscript is rather long, but the presented information justifies its length. It is in general well structured and well written and can be considered for publication in WES after addressing a few minor comments.

Line 51: opening "(" missing for the citations

First paragraph section 2 methods: The manuscript would highly benefit from a better and more detailed introduction of the ASSIST system

Lines 85/86: "TROPoe utilizes a spectrally-resolved and extensively validated radiative transfer model (Turner et al., 2004; Clough et al., 2005; Mlawer and Turner, 2016) to simulate the spectral radiance that is associated with a given temperature profile"; I think it is not only the temperature profile, but also the humidity profile that plays a role here, right?

Line 224: "and exhibits a gradual monotonic trend with height"; what is the reason for this increase with height? Mainly the increase in range gate length/probe volume with altitude, or are there other effect in play?

First par section 3.3., starting with line 244, description of the mast measurement setup; I miss here a bit more detailed description of the temperature measurement system; are the differences based on thermocouples? which type is the absolute temperature sensor at 3 m?

Line 293: "For an ergodic, horizontally homogeneous field, this reads....."; Is this assumption generally valid? I would expect this maybe in neutral and partially stable conditions, but not necessarily for daytime convective situations.

Fig. 16 f: do you have any idea/hypothesis, why the distribution for the data at the site North is considerably broader compared to South and Middle? That site seems to have a different micro-climate compared to the two others (see also some of the following comments)

figures 17 a-c indicate that it is station North causing the differences/deviations

Fig 18: again, North shows a distinct differing behavior

Fig. 20: in all plots before the order was different: south-middle-north....., which feels a bit inconsistent; but I fully understand the point to plot the Northernmost station on top....

Line 651 references: "XXXX-XXXXX" should there be another report identifier?

Final curiosity question: have there been deployed passive microwave radiometers for temperature profiling in parallel during AWAKEN, and if yes are there any plans to compare both methods?