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Comment on nhess-2021-105

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Community comment on "EUNADICS-AV early warning system dedicated to supporting aviation in the case of a crisis from natural airborne hazards and radionuclide clouds" by Hugues Brenot et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-105-CC1>, 2021

I have several observations and it would be very nice if there will be some clarifications. Regarding Table 5, it will be very useful to have the numerical values of the thresholds given. Why don't you use particles extinction and backscatter coefficients from lidars (as mentioned in Table 3)? Moreover, the example from Fig. 13 uses particle backscatter coefficient. What do you mean by 'Range of att. backscatter' in Table 5? To me, what is of interest is the pollution layer geometry (layer altitude and depth).

Please mention the timeliness for EWS, i.e., when the warning will be issued after the event (hours).

Does the example given in Fig. 14 represent a hazard? I see it just as an illustration of the Eprofile capability. Please mention if you have any criteria for attenuated backscatter from which you can set a warning.

I am a bit confused about Fig. 13. You mention that the alert uses mass concentration based on backscatter coefficients thresholds. According to Papagiannopoulos et al. (2020), the thresholds are for particle backscatter coefficients, based on given mass concentrations (eq. 9). Please correct and cite the reference. Please comment on uncertainty.

Please comment on plumes heights. So far, you give examples for ash top height and SO₂ plume height estimated from satellites (Figs. 3 and 5). How this information corroborates with the total SO₂ concentration (threshold of mass loading of 5 kt, page 38). On the other hand, why no lidar or ALC system is used to determine the plumes geometry?

Why the lidars are not used for smoke identification? There are many papers on aerosol type, mostly based on lidar ratio and extinction Angstrom exponent. Again, why is just volume depolarization ratio used? Moreover, why not particle linear depolarization ratio?