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Dr Robyn Schofield, Associate Editor
Atmospheric Measurement Techniques

Dear Dr Schofield,

Please find below our response to the comment from the anonymous reviewer of our paper: "Identifying 'persistent temperature inversion' events in a Subalpine Basin using Radon-222".

We would like to thank the reviewer for taking the time to look over our manuscript and provide us with comprehensive constructive feedback.

Best regards,

Dafina Kikaj
(on behalf of all co-authors)

Response to Anonymous reviewer's comments

In this paper the authors provide an efficient methodological strategy to solve PBL problems, including the characterization events of extreme stability promoting the buildup of excess air pollution levels. The approach presented is based on the smart use of radon, a historical atmospheric radiotracer, including an extremely accurate evaluation of radon data within a very detailed meteorological framework. The methodology developed shows a great potential in capturing the boundary layer behaviour in districts of complex topography. The method efficiently succeeds in detecting critical stability events whereas other techniques present huge limitations both in the description of the event and in the predictability potential. The comparison with a temperature based methodology proposed by other authors and applied simultaneously with radon appears less precise and reliable than the radon-based approach, while in complex topography and non uniform landscapes, it is known that boundary layer is poorly described by atmospheric modelling whose limited spatial resolution prevent for suitable description. Improvements in the methodology are expected with the introduction on a routine basis of more sensitive devices for radon measurement (herein defined as "research-oriented": I would say "atmosphere-oriented) in respect to the classical Alphaguard herein used. I do agree that the extensive use of this method would greatly improve the study of boundary layer problems, even when atmospheric modelling will reach sufficient capability. As such radon, thanks to its intrinsic characteristics, will always be useful not only for independent but objective evaluation of the PBL conditions, but also in other non negligible aspects such as the model calibration.

Thank you for your positive evaluation of our manuscript.