



## Supplement of

## Intercomparison study of atmospheric <sup>222</sup>Rn and <sup>222</sup>Rn progeny monitors

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## Introduction

We present here the hourly time series of the differences between the atmospheric <sup>222</sup>Rn or <sup>218</sup>Po activity concentration measured by each monitor (HRM, LSCE and ANSTO) and those measured by the ARMON at Orme de Merisiers (ODM) and Saclay (SAC) stations during Phase I and II of our inter-comparison study. We also present plots of the linear regression fits calculated during the Phase I and II of these measurement campaigns. Finally, we show the results of the linear regression fits calculated between the ratio of the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the HRM or LSCE monitors and the <sup>222</sup>Rn activity concentration measured by the ANSTO\_ODM and ARMON, respectively, against the ambient temperature measured during the Phase I at the ODM site.



Figure S1. Hourly time series of the differences (a) and the ratios (b) between the atmospheric <sup>222</sup>Rn or <sup>218</sup>Po activity concentration measured by each monitor (HRM (green circles), LSCE (orange circles) and ANSTO\_ODM (blue circles)) and the <sup>222</sup>Rn measured by the ARMON at Orme de Merisiers (ODM) station during Phase I (between 25 November 2016 and 23 January 2017).



Figure S2. Hourly time series of the differences (a) and the ratios (b) between the atmospheric <sup>222</sup>Rn or <sup>218</sup>Po activity concentration measured by each monitor (HRM (green circles) and ANSTO\_SAC (blue circles)) and the <sup>222</sup>Rn measured by the ARMON at Saclay (SAC) station between 25 January 2017 and 13 February 2017.



Figure S3. Left panel: Linear regression fits between the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the LSCE monitor and the <sup>222</sup>Rn activity concentrations measured by ARMON during Phase I at the ODM site. **Right panel**: Linear regression fits between the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the LSCE monitor and the HRM during Phase I at the ODM site.



Figure S4. Left panel: Linear regression fits between the hourly atmospheric <sup>222</sup>Rn activity concentrations measured by the ANSTO ODM monitor and ARMON during Phase I at the ODM

site. **Right panel**: Linear regression fits between the hourly atmospheric <sup>222</sup>Rn activity concentrations measured by the ANSTO\_ODM monitor and the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the HRM during Phase I at the ODM site.



Figure S5. Left panel: Linear regression fits between the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the HRM and the hourly atmospheric <sup>222</sup>Rn activity concentration measured by the ARMON during Phase I at the ODM site. **Right panel**: Linear regression fits between the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the HRM and the hourly atmospheric <sup>222</sup>Rn activity concentration measured by the ARMON during Phase II at the SAC site.



Figure S6. Left panel: Linear regression fits between the hourly atmospheric <sup>222</sup>Rn activity concentrations measured by the ANSTO\_SAC and by ARMON during the Phase II at the SAC site. **Right panel**: Linear regression fits between the hourly atmospheric <sup>222</sup>Rn activity concentrations measured by the ANSTO\_SAC and the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the HRM during Phase II at the SAC site.



Figure S7. Left panel: Linear regression fit results relative to the ARMON at ODM. Right panel: Linear regression fit results relative to the ARMON at SAC.



Figure S8. Left panel: Linear regression fits between the ratio of the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the HRM and the <sup>222</sup>Rn activity concentration measured by the ANSTO\_ODM and by ARMON during Phase I at ODM against the ambient temperature measured at the same station. **Right panel**: Linear regression fits between the ratio of the hourly atmospheric <sup>214</sup>Po activity concentrations measured by the LSCE and the <sup>222</sup>Rn activity concentration measured by the ANSTO\_ODM and by ARMON during Phase I at ODM against the ambient temperature measured by the ANSTO\_ODM and by ARMON during Phase I at ODM against the ambient temperature measured at the same station.