Supplement of

Intercomparison study of atmospheric $^{222}\text{Rn}$ and $^{222}\text{Rn}$ progeny monitors

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Introduction

We present here the hourly time series of the differences between the atmospheric $^{222}$Rn or $^{218}$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 $^{214}$Po activity concentrations measured by the HRM or LSCE monitors and the $^{222}$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 $^{222}$Rn or $^{218}$Po activity concentration measured by each monitor (HRM (green circles), LSCE (orange circles) and ANSTO_ODM (blue circles)) and the $^{222}$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 $^{222}\text{Rn}$ or $^{218}\text{Po}$ activity concentration measured by each monitor (HRM (green circles) and ANSTO_SAC (blue circles)) and the $^{222}\text{Rn}$ 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 $^{214}$Po activity concentrations measured by the LSCE monitor and the $^{222}$Rn activity concentrations measured by ARMON during Phase I at the ODM site. **Right panel:** Linear regression fits between the hourly atmospheric $^{214}$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 $^{222}$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 $^{222}\text{Rn}$ activity concentrations measured by the ANSTO_ODM monitor and the hourly atmospheric $^{214}\text{Po}$ activity concentrations measured by the HRM during Phase I at the ODM site.

![Graph](image1)

Figure S5. **Left panel:** Linear regression fits between the hourly atmospheric $^{214}\text{Po}$ activity concentrations measured by the HRM and the hourly atmospheric $^{222}\text{Rn}$ activity concentration measured by the ARMON during Phase I at the ODM site. **Right panel:** Linear regression fits between the hourly atmospheric $^{214}\text{Po}$ activity concentrations measured by the HRM and the hourly atmospheric $^{222}\text{Rn}$ activity concentration measured by the ARMON during Phase II at the SAC site.
Figure S6. **Left panel**: Linear regression fits between the hourly atmospheric $^{222}$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 $^{222}$Rn activity concentrations measured by the ANSTO_SAC and the hourly atmospheric $^{214}$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 $^{214}$Po activity concentrations measured by the HRM and the $^{222}$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 $^{214}$Po activity concentrations measured by the LSCE and the $^{222}$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.