

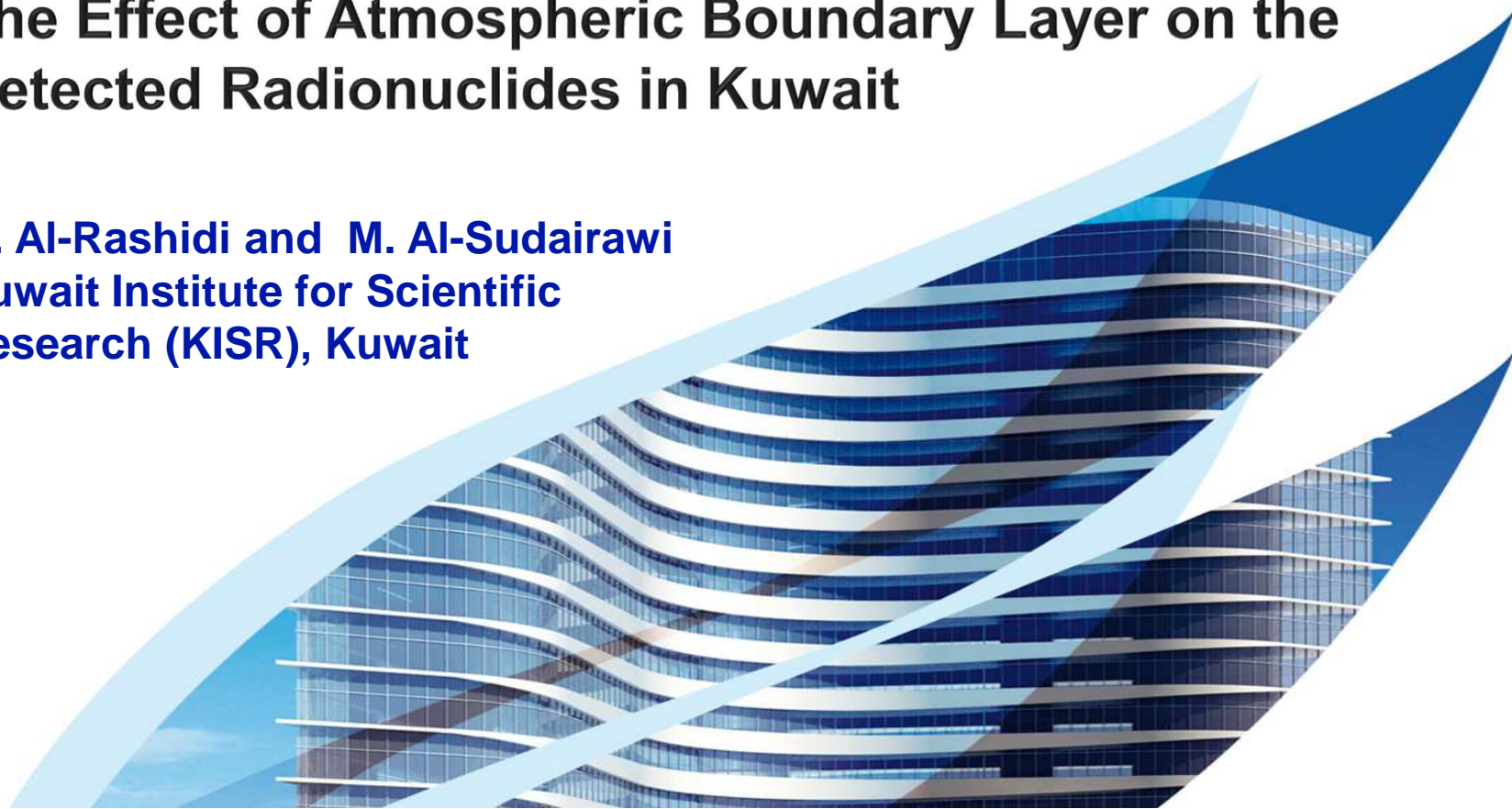
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The Effect of Atmospheric Boundary Layer on the Detected Radionuclides in Kuwait

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**Kuwait Institute for Scientific
Research (KISR), Kuwait**



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Outline:

- ✓ Overview of the Weather in Kuwait
- ✓ Upper Air MTP-5HE Meteorological Temperature Profiler
- ✓ Measurements of Be7, and Cs137 at KWP40 (RN40) IMS Station
- ✓ Correlation Between Measured Radionuclides and the Inversion Layer Height
- ✓ Conclusion
- ✓ References

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Weather in Kuwait

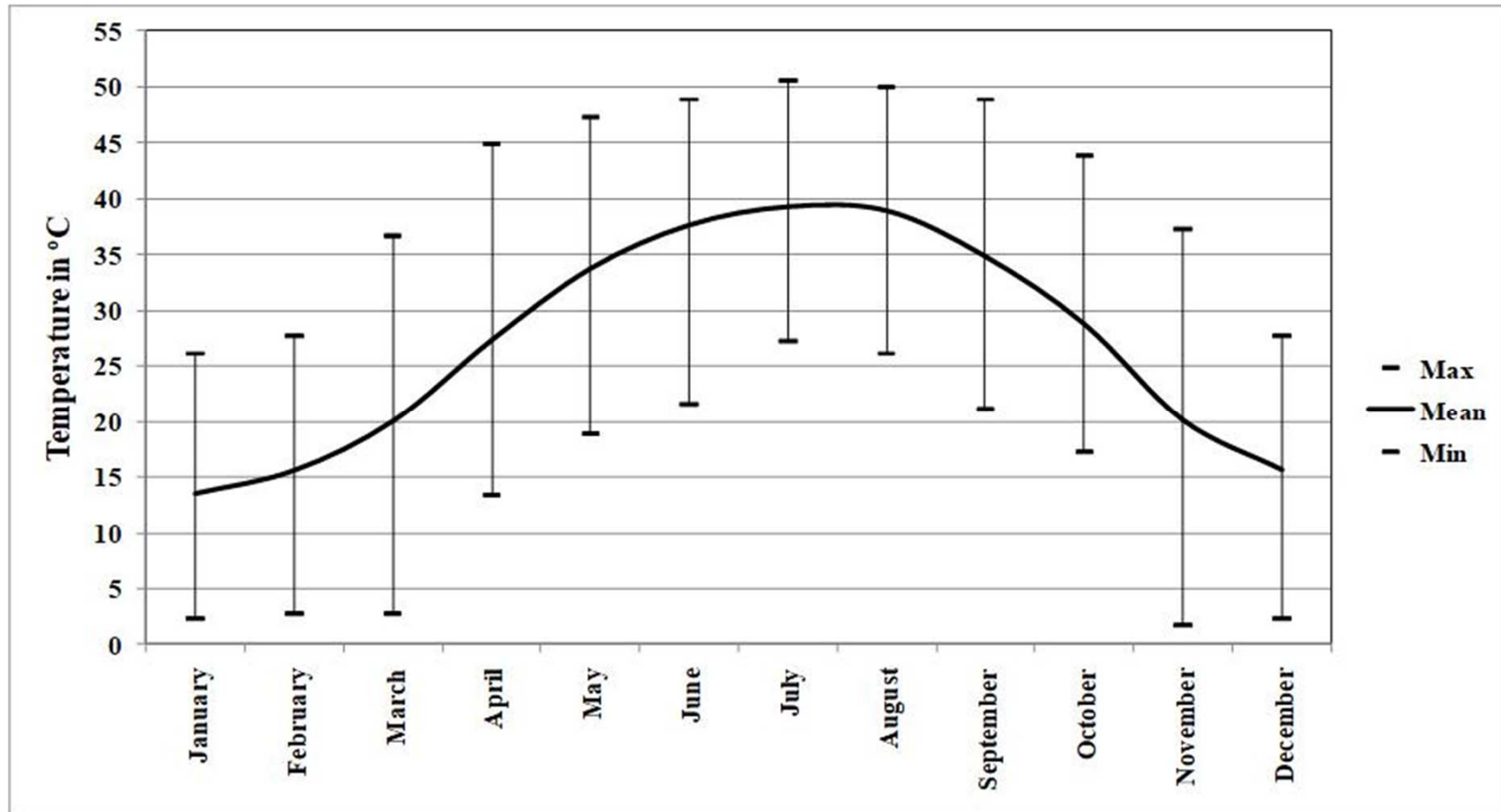
The weather has a typical dry desert climate which involves deposition and re-suspension of atmospheric particulate matter.



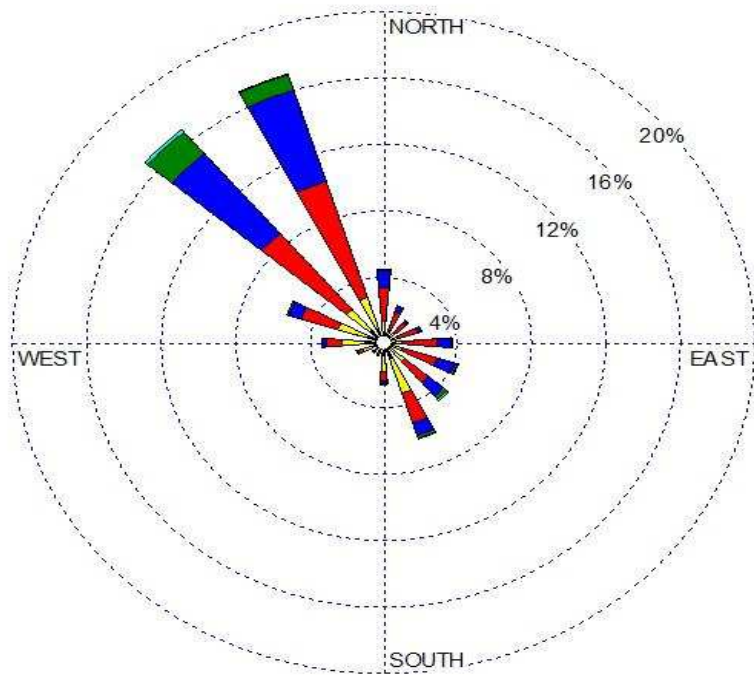
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Weather in Kuwait



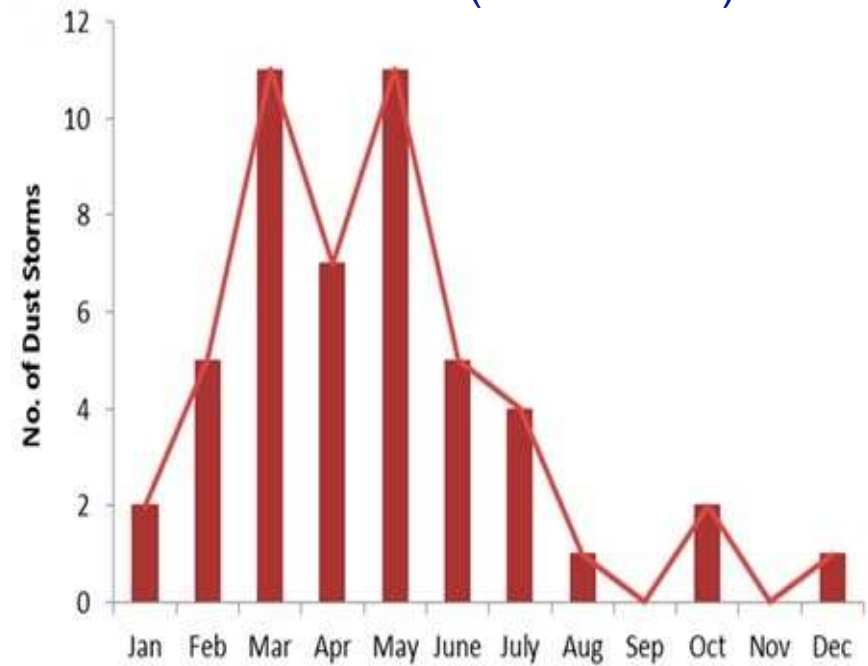
Weather in Kuwait



Wind Rose

Calms: 21.68%

Dust storms (2010–2017)



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Measurements Site



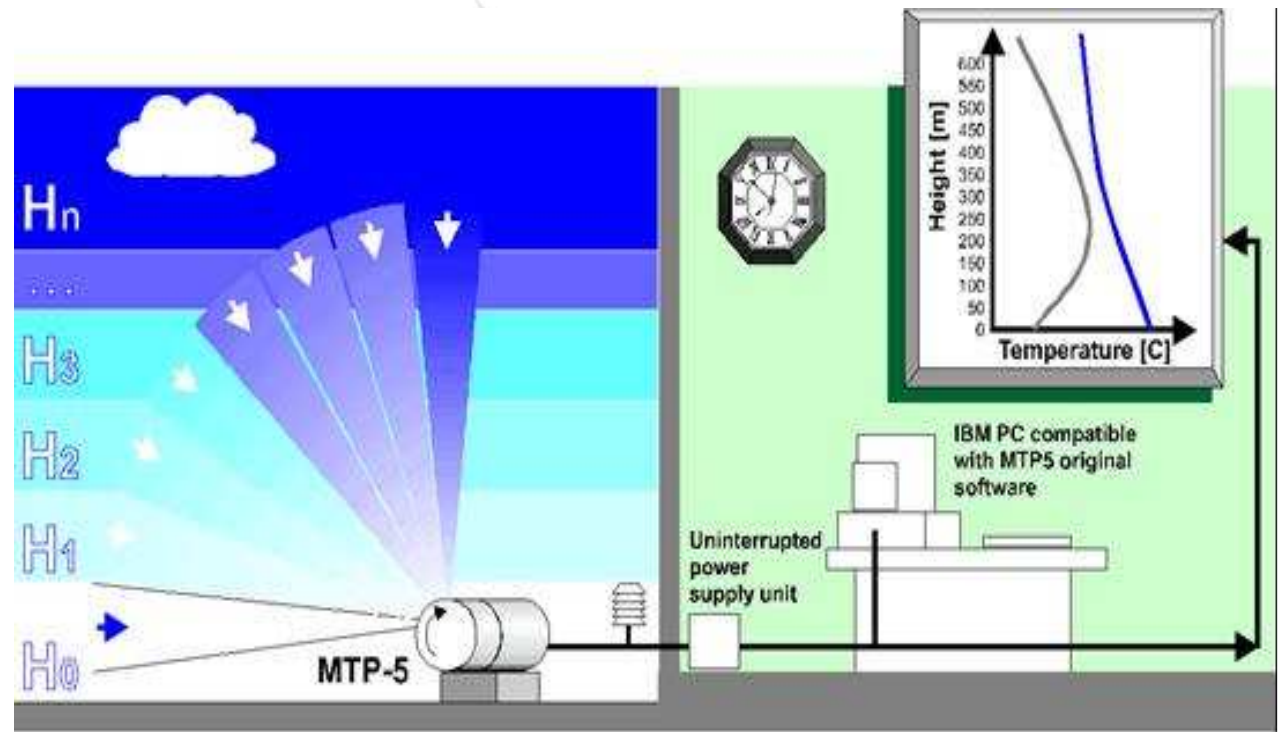
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MTP-5HE Temperature Profiler

 **KISR**
Kuwait Institute for Scientific Research

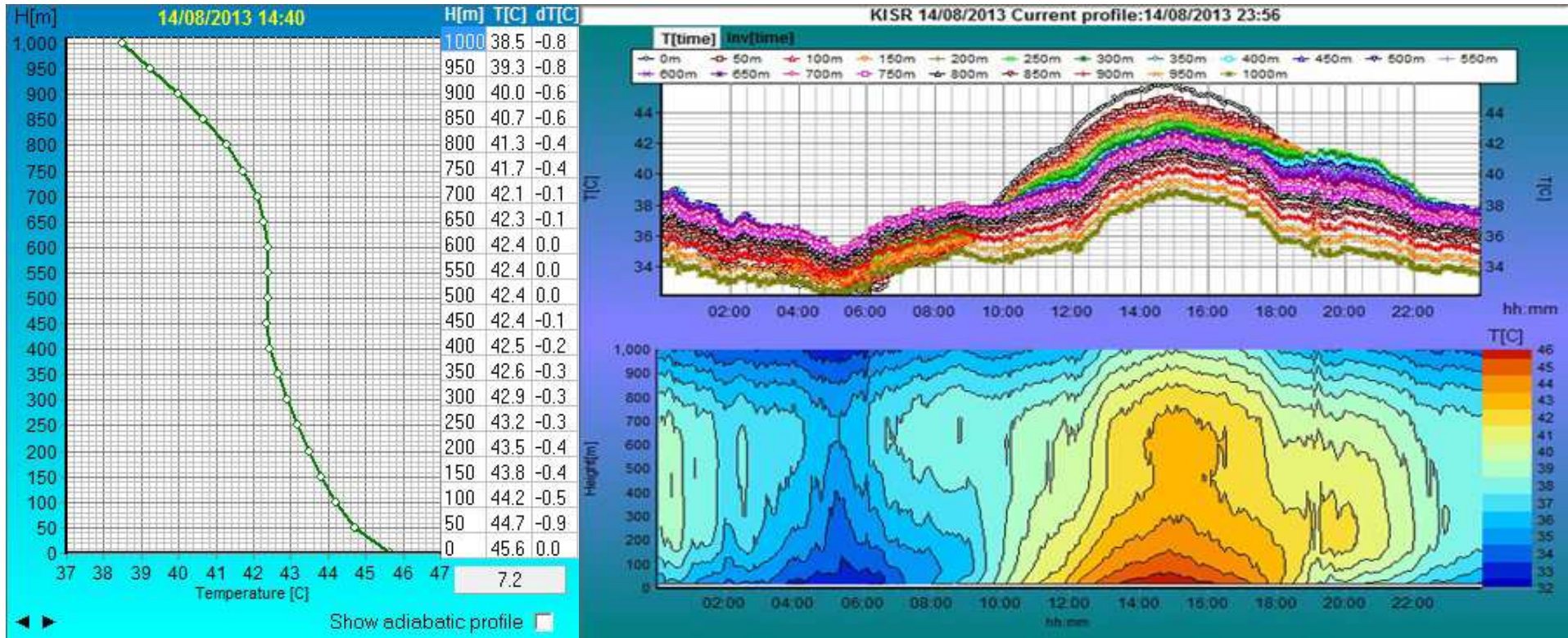
- ✓ Microwave remote sensing technique
- ✓ Thermal radiation of the atmosphere at the centre of the molecular oxygen absorption line, around 5 nm is measured by a sensitive radiometer



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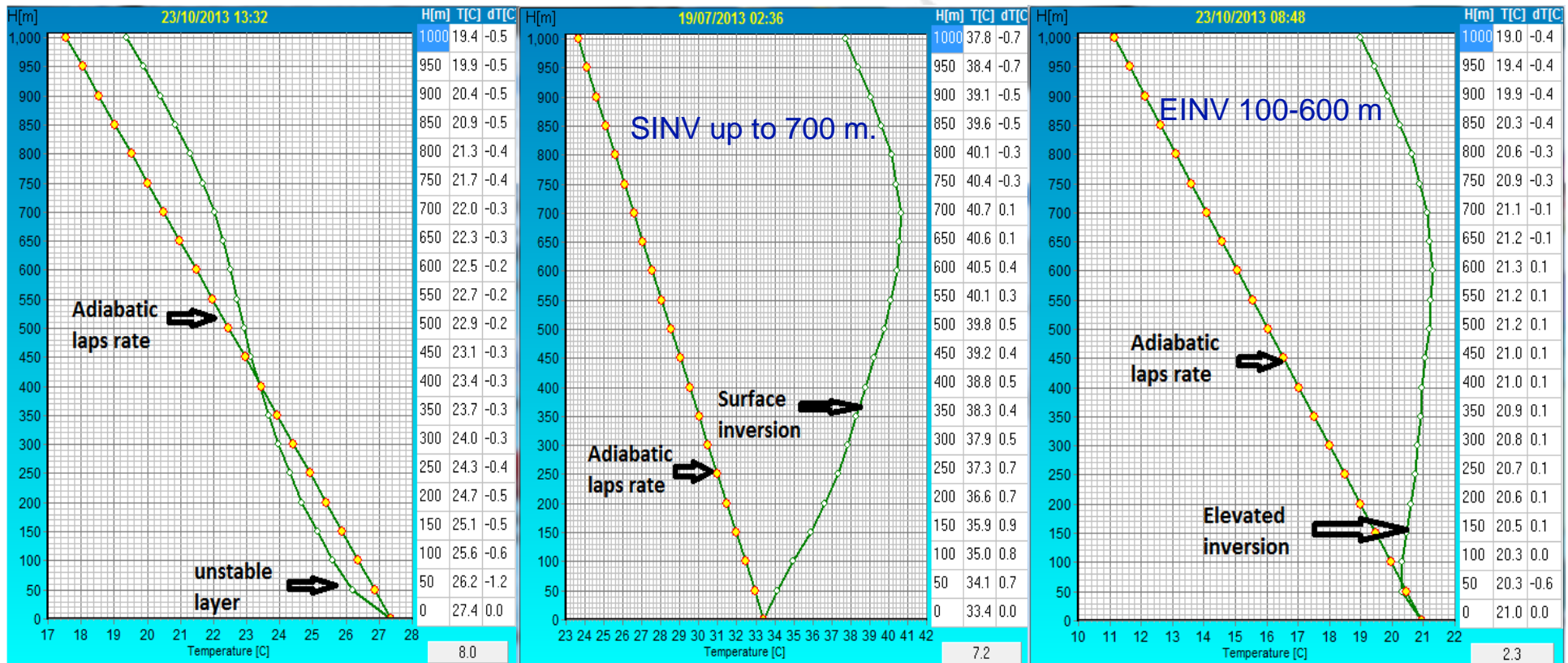
MTP-5HE Temperature Profiler



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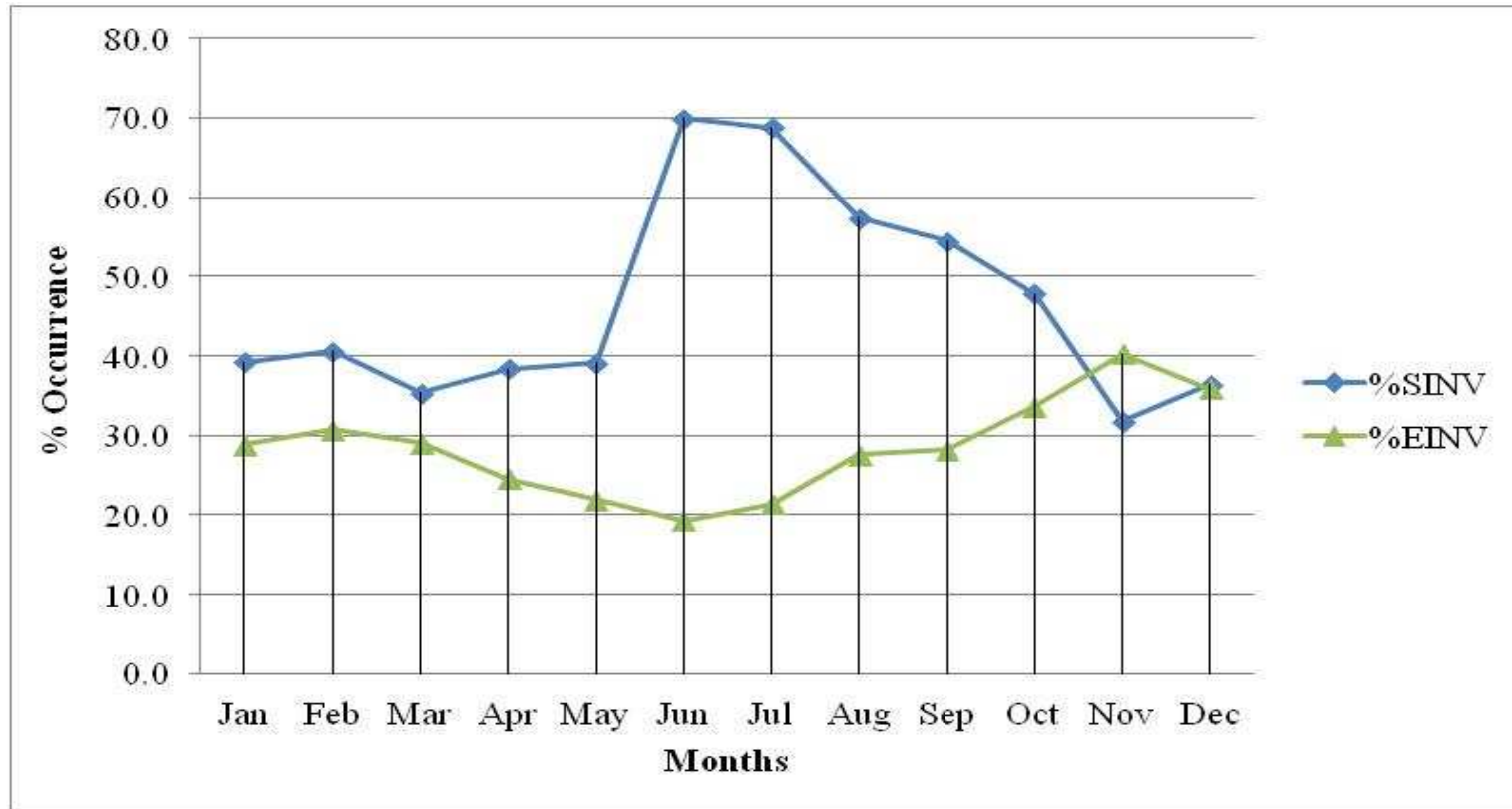
MTP-5HE Temperature Profiler



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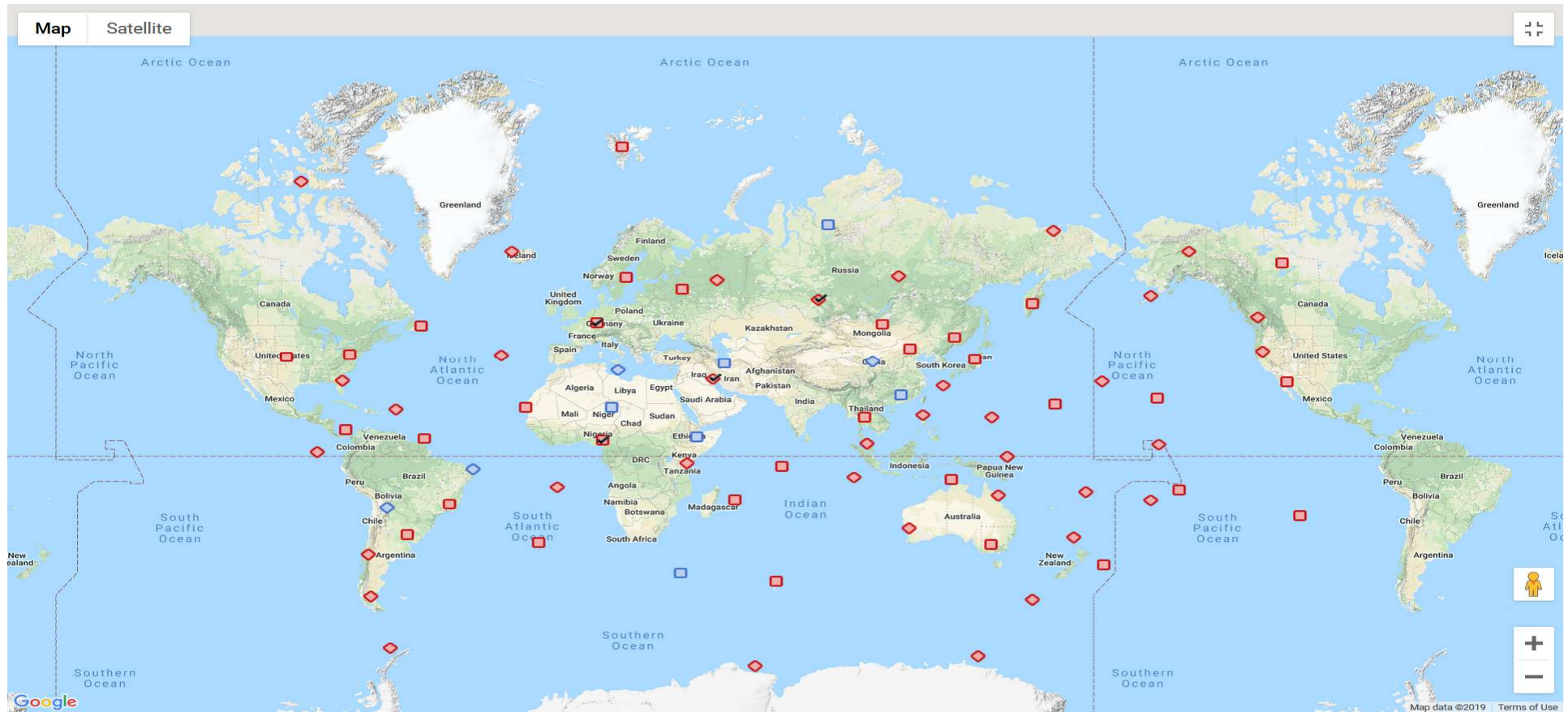
MTP-5HE Temperature Profiler



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Measurements of Be7, and Cs137 at RN40



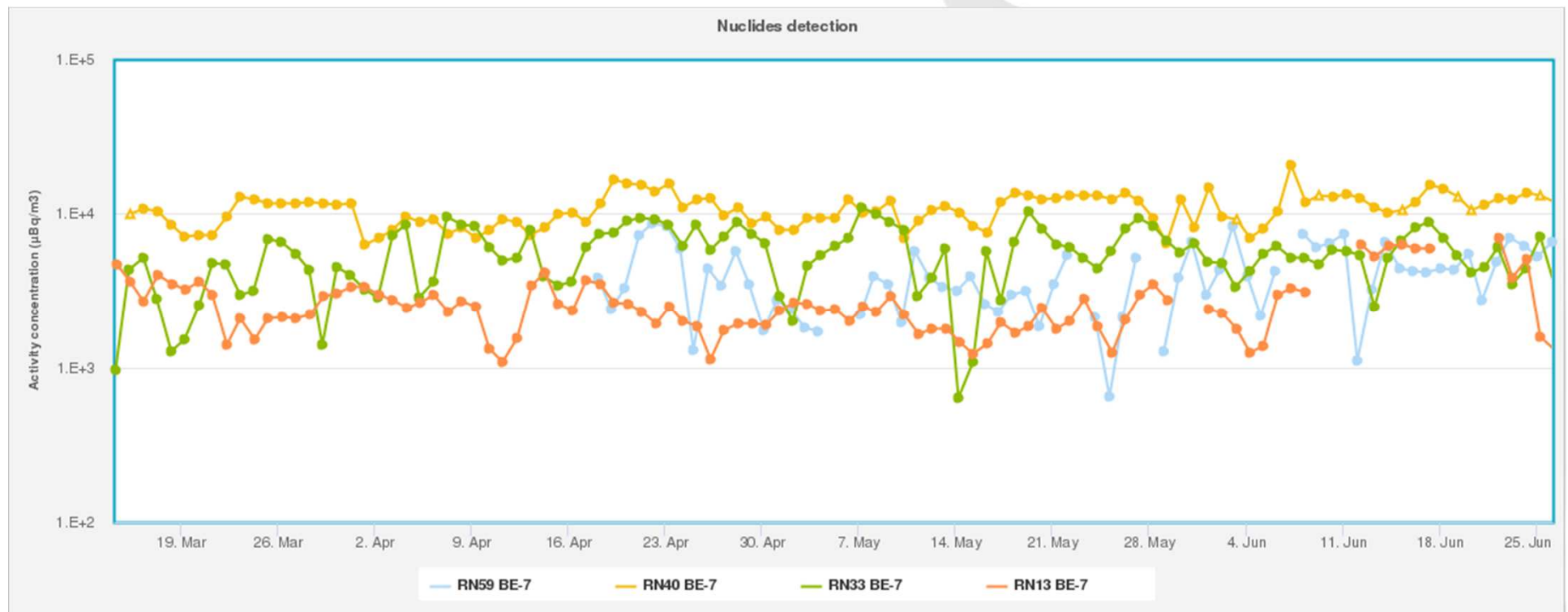
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RN13,Africa,Cameroon; RN59,Eastern Europe, Russian Federation; RN40,Middle East, Kuwait;
RN33, Western Europe, Germany

Period: 19 Mar 2018 - 25 Jun 2018; **Units:** $\mu\text{Bq}/\text{m}^3$



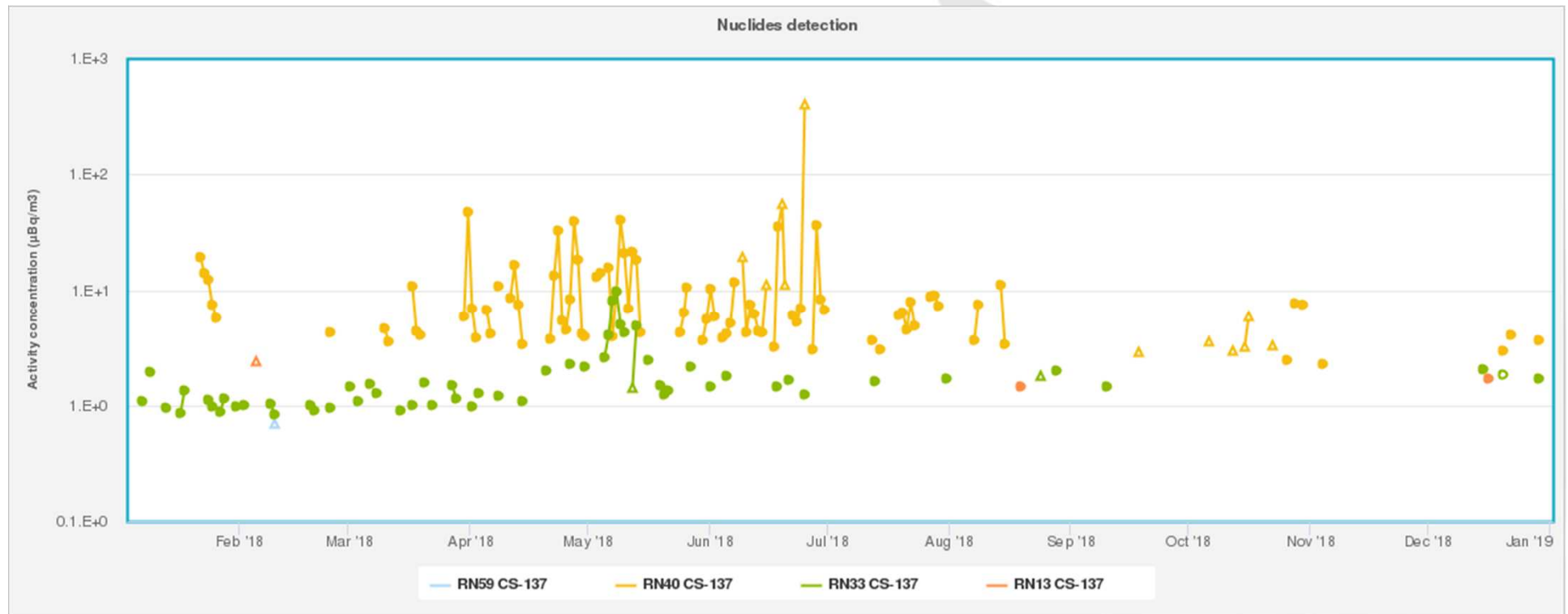
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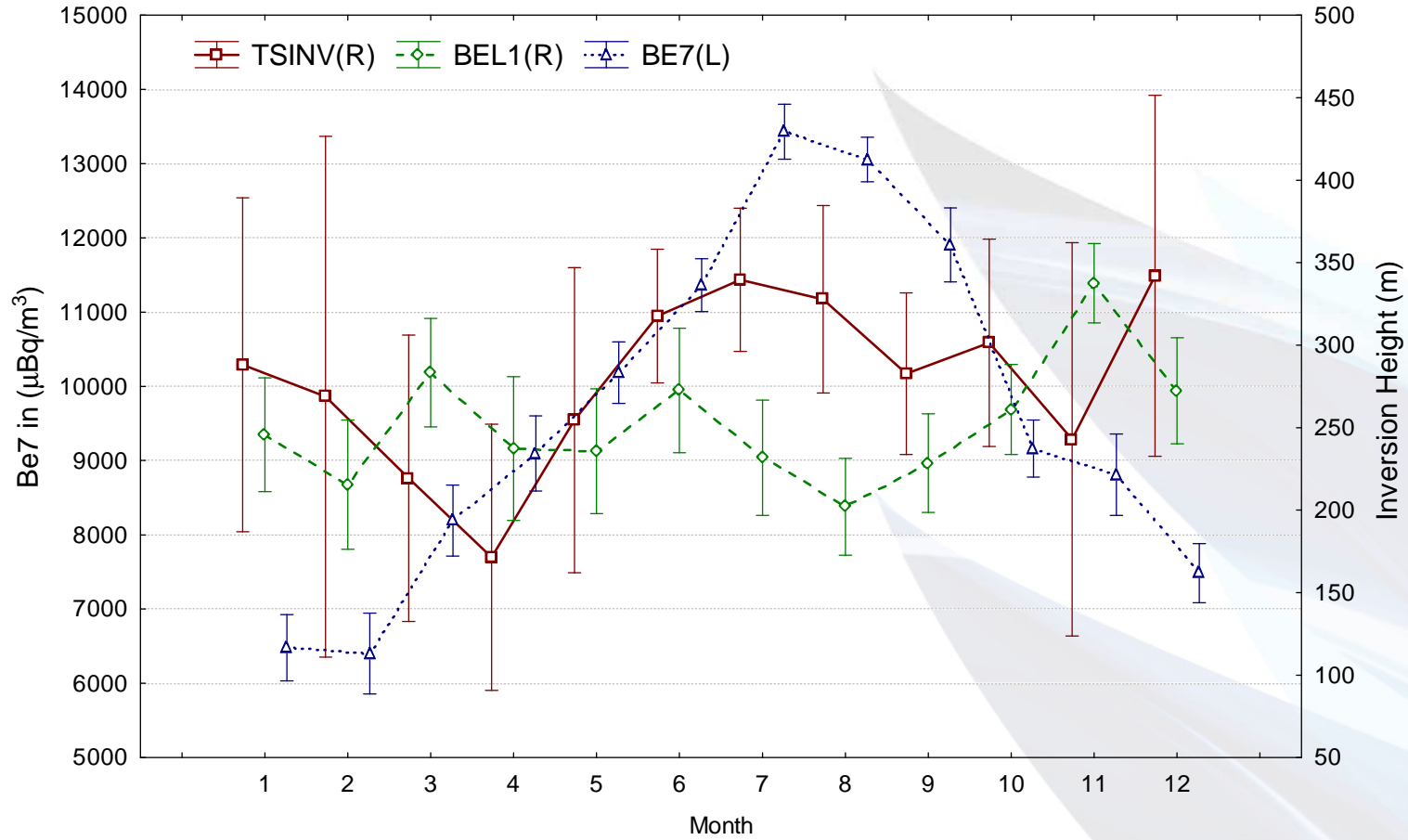


RN13,Africa,Cameroon; RN59,Eastern Europe, Russian Federation; RN40,Middle East, Kuwait;
RN33, Western Europe, Germany

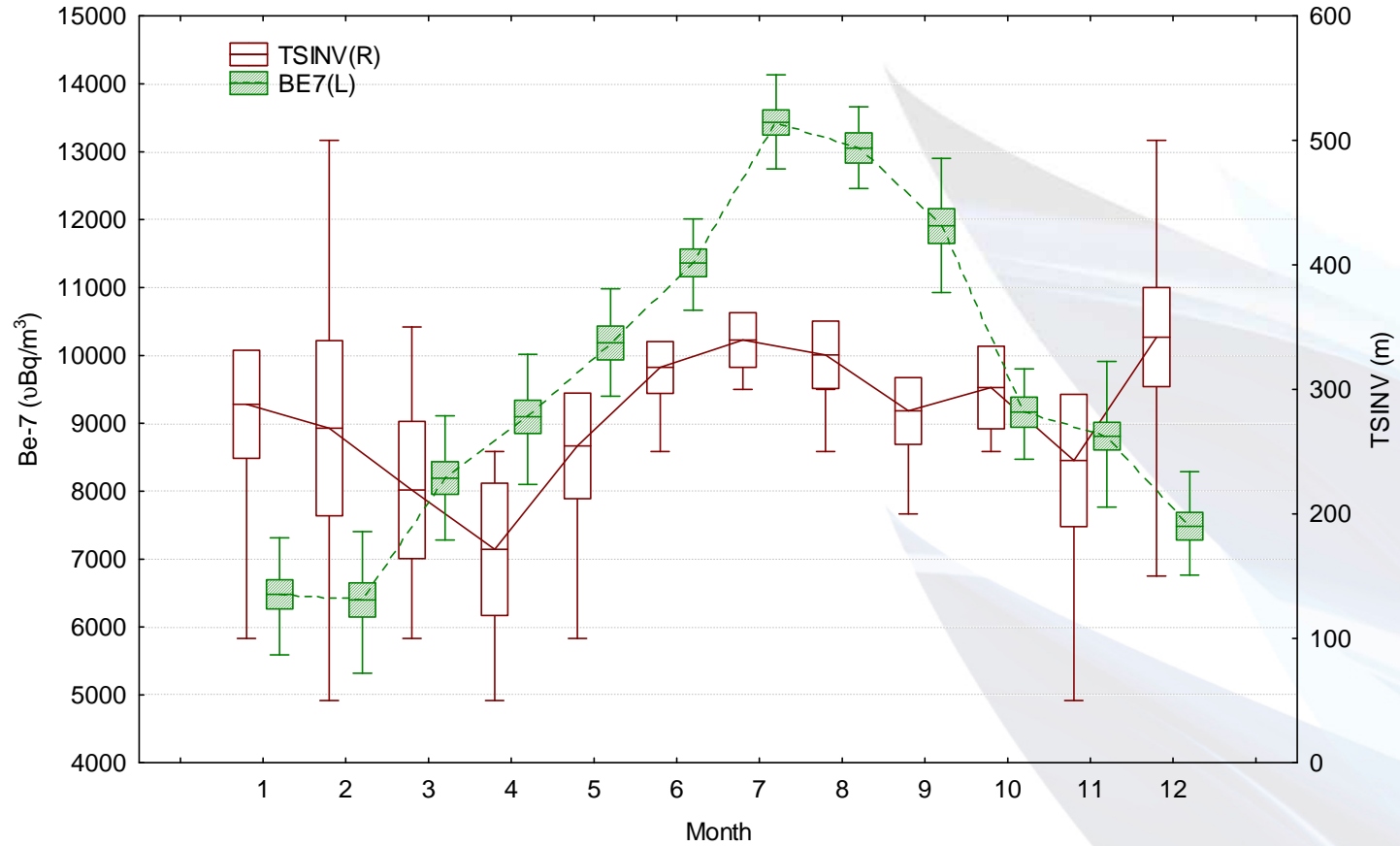
Period: 01 Jan 2018 - 30 Dec 2018; **Units:** $\mu\text{Bq}/\text{m}^3$



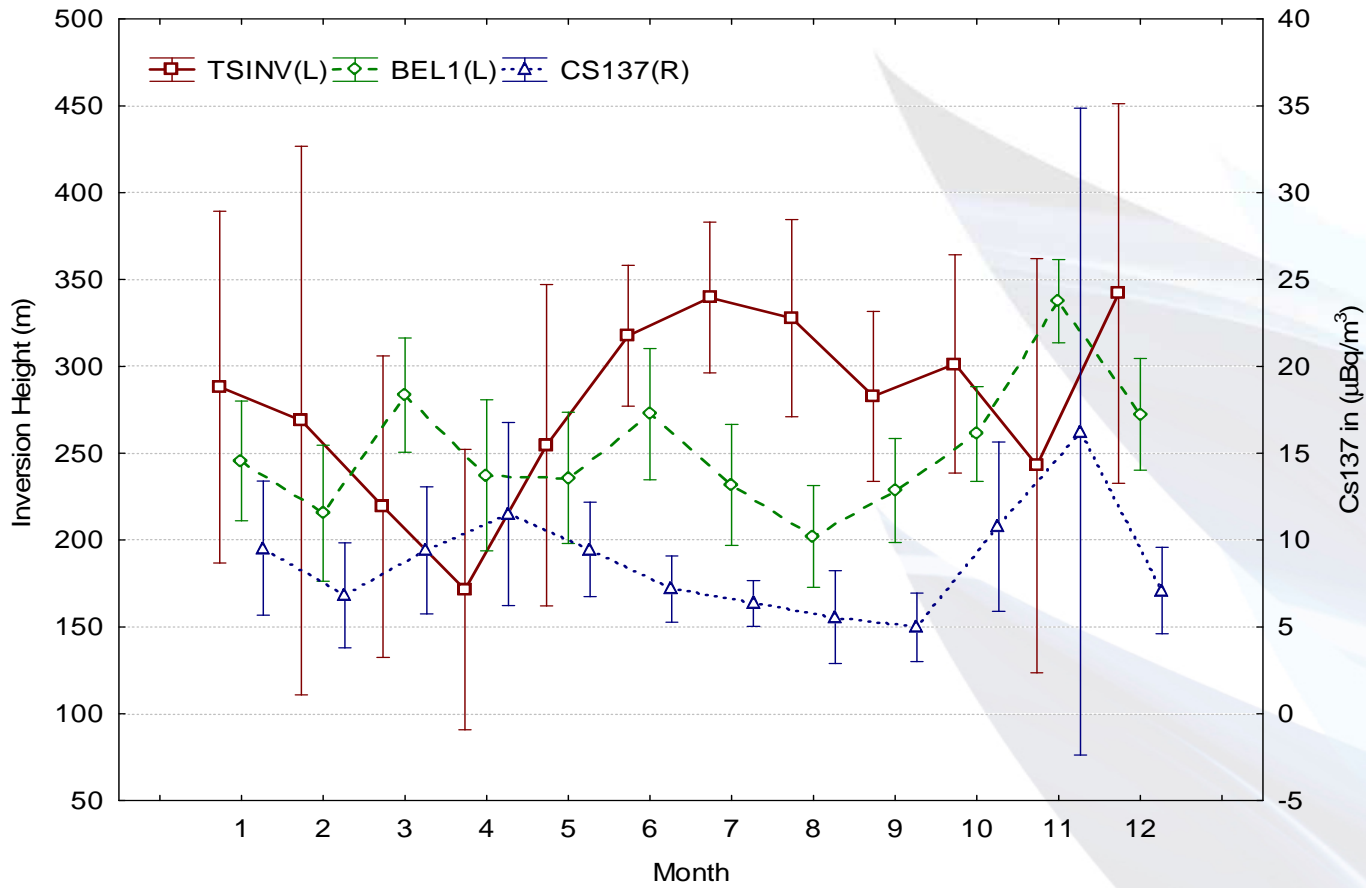
Effect of the Inversion on the Radionuclides



Effect of the Inversion on the Radionuclides



Effect of the Inversion on the Radionuclides



Conclusion Remarkd

- Ground-based inversions measured by MP-5 in this study were stronger in the Summer than those reported in earlier studies using radiosonde data in Kuwait
- The height of base EINV has the most significant effects on the dispersion and dilution of Radionuclides at the ground level as it determines the mixing height.
- Height and the frequencies of the formation of the surface temperature inversion were linked with the high concentrations of both radionuclides detected in Kuwait

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References

1. Al-Hemoud, Ali, et al. "Economic Impact and Risk Assessment of Sand and Dust Storms (SDS) on the Oil and Gas Industry in Kuwait." *Sustainability* 11.1 (2019): 200.

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Thank you

