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# Monitoring of space weather and radioactivity using small airborne platforms

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Space Weather is increasingly considered as a hazard to society's technological systems, but the effects of energetic particles within the atmosphere – with a potential implication for climate – also present an area in which new scientific knowledge needs to be developed. Routine measurements of energetic particle fluxes made above the surface have been made by the Lebedev Institute, undertaking continuous balloon-carried measurements since 1957. An underexploited measurement opportunity is presented by the conventional weather balloons (radiosondes) launched regularly globally by meteorological services, which could potentially provide a cost-effective alternative to custom balloon flights, as well as the ability to make measurements of particle fluxes at a wide range of latitudes. This work describes the development of a small disposable ionisation sensor, exploiting the well-known response of inexpensive semiconductor devices (e.g. PIN photodiodes) to ionising radiation. Such a Photodiode Radiation Detector (PRD) is particularly suitable for balloon use, as, unlike previous Geiger tube detector systems, only low bias voltages are required, which simplifies the circuitry required, reduces power consumption and entirely removes any high voltage hazard. In addition to providing count rate information, basic energy spectrum information is in principle available from pulse amplitudes generated. We discuss the evaluation and deployment considerations for the use of a PRD on a standard radiosonde platform, to operate within and alongside the existing operational meteorological requirements.