

Decrease of Be-7 concentration in the atmosphere on earthquake-days

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1.Introduction

JAEA conducts the observation of radionuclides in the atmosphere as monitoring activities of CTBT. This study analyzed the correlation between earthquake-days in and near Japan and the Be-7 concentration observed at Takasaki, Gunma, for the period from August 21, 2003 to December 3, 2007. Be-7 (half-life 53 days) is a product of nuclear interaction between cosmic rays and the atmospheric constituents oxygen and nitrogen.

2.Data

(1)Definition of 'Earthquake-days'

'Earthquake-day' is defined as a day when one or more earthquakes of M5 or greater other than aftershocks, earthquakes swarm etc. occur in the area (25-47N, 128-150N). It is assumed that the earthquakes which occur for a period of 240 hours (10 days) after an earthquake-day and within 1 degree (longitude) and 1 degree (latitude) of the epicenter of an earthquake of M5 or greater are aftershocks, earthquakes swarm etc.

(2)Observation of Be-7

The air sampling is conducted through 24 hours from around 15 hour 50 minute (Japan Standard Time) of the previous day to around 15 hour 50 minute of the day. The daily average of Be-7 concentration for each day is used in this study.

3.Result

The average of the Be-7 concentration is 3.90mBq/m^3 on earthquake-days with a focal depth of 40km or greater (103 days). The average of the Be-7 concentration is 4.54mBq/m^3 on the other days (813 days). This result shows that the average of the Be-7 concentration on earthquake-days with a focal depth of 40km or greater is significantly greater than the average of the Be-7 concentration on the other days ($p=0.004$ by t-test).

4.Discussion

This result may suggest that there exists a physical relationship between earthquakes and Be-7 concentration in the atmosphere. There may exist a relationship between earthquakes and atmospheric phenomena.