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Temporal variations of 7Be and 210Pb activity in aerosols at Xiamen, China

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The radionuclides serve as powerful tracers to identify and quantify several atmospheric processes, such as source, transport and mixing of air masses, air masses exchanging between various atmospheric layers, residence times of atmospheric gasses and pollutants. 7Be and 210Pb activities in aerosols were measurement from October, 2013 to September, 2015 at Xiamen (24°26′7.44″N, 118°5′31.30″N) in South China. The activity of 7Be and 210Pb in aerosols from 2013 to 2015 in Xiamen ranged from 0.26 to 9.05 (mean:4.15) mBq m-3 and from 0.14 to 2.64 (mean:1.05) mBq m-3, respectively. The mean activity of 7Be was comparable with the activities of other places in the same latitude, while the mean activity of 210Pb was lower than the activity of the locations at high altitudes. The possible reason is that Xiamen is a coastal city located on southwest Pacific. The activities of 7Be and 210Pb had a commonly low value in summer (July-September) and a high value in autumn (October-December), it may be controlled by the rainfall. There is significant relationship between the monthly 210Pb activities and the concentration of PM 2.5 and PM 10. In contrast, monthly 7Be activities only show significant correlation with the concentration of PM 10, which implies that 7Be and 210Pb can be used to trace the different sources of the aerosols. And the dry 7Be depositional fluxes increased with latitude along the coast of China (R2=0.92, n=8).