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Estimation Of 137Cs Using Atmospheric Dispersion Models After A Nuclear Reactor Accident

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Nuclear energy will continue to have an important role in the production of electricity in the world as the need of energy grows up. But the safety of power plants will always be a question mark for people because of the accidents happened in the past. Chernobyl nuclear reactor accident which happened in 26 April 1986 was the biggest nuclear accident ever. Because of explosion and fire large quantities of radioactive material was released to the atmosphere. The release of the radioactive particles because of accident affected not only its region but the entire Northern hemisphere. But much of the radioactive material was spread over west USSR and Europe. There are many studies about distribution of radioactive particles and the deposition of radionuclides all over Europe. But this was not true for Turkey especially for the deposition of radionuclides released after Chernobyl nuclear reactor accident and the radiation doses received by people.

The aim of this study is to determine the radiation doses received by people living in Turkish territory after Chernobyl nuclear reactor accident and use this method in case of an emergency. For this purpose The Weather Research and Forecasting (WRF) Model was used to simulate meteorological conditions after the accident. The results of WRF which were for the 12 days after accident were used as input data for the HYSPLIT model. NOAA-ARL's (National Oceanic and Atmospheric Administration Air Resources Laboratory) dispersion model HYSPLIT was used to simulate the 137Cs distrubition. The deposition values of 137Cs in our domain after Chernobyl Nuclear Reactor Accident were between 1.2E-37 Bq/m2 and 3.5E+08 Bq/m2. The results showed that Turkey was affected because of the accident especially the Black Sea Region. And the doses were calculated by using GENII-LIN which is multipurpose health physics code.