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Radon daughters survey in atmosphere of Athens and correlation with of vehicle's exhausts (gasoline combustion)

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In this paper we have done a continuous measuring of Radon daughters ^{218}Po, ^{216}Po ^{214}Po^{212}Po, for
of twenty nine months, from June 2003 until November 2005 in the atmosphere environment.
The area of this study was at a main avenue of the city of Athens, which is very hectic during the whole
used an active detector, whose function is based on a-spectroscopy method. The results of our measu
were correlated with the data obtained from the counters, of the Greek Environmental Ministry, div
pollution (they count CO, CO_2, NO_2, NOX, SO_2) which were placed in several parts of the city.
The collected data of this survey are very interesting, because at the normal day's traffic, our value
exceed the 20 Bq/m3, for ^{218}Po and *40 Bq*/m3 for ^{214}Po. But when there were the taxis- strike (15.0
vehicles out of circulation and duplication of the private cars in the road due the daily habitant's nec
in some days of the months, June, September, October November and December 2003 the values i
more than 40 and 100 Bq/m3 in correspondence. At the same time we observed an increase to the v
the air polluters CO NOX, CO2, SO2 at the detectors of air pollution division of our Environmental M
According the results month of June we proceeded in our research to the next months also and we
same results.
The city of Athens is localized in the region Attica basin and has 3.000.000 population. The town is co
to the seaside by three avenues in Southwest direction .These avenues are daily full of traffic due t
commuting to the center of the city, most of them going to work. The total number of vehicles circu
the city is 1.800.000 private cars, 15.000 taxis (84% diesel), 177.000 light trucks, 50.900 heavy tru
6.940 public buses. Cars exhaust problem start in our city since decade 1980, with a vast internal emig
the population from the province to the capital. (Logarithmic increase of vehicles). Governments hac
several restrictions but the problem remains.
In this research we use an active detector in which the sampled air volume is sucked through a filte
analyzed continuously by a Si-detector. (The detector is accompanied with certificate of calibration.)
samples on the surface of the filter are analyzed with respect to their alpha decay energy by alpha spect
In the end of the measurements, we can obtain P.A.E.C. ERC, absorbed dose and Rn daughters ^{212}Po
^{216}Po**,** ^{218}Po.We choose one of the main four avenues, which is 3.5 km long and 12 m. large, double c
and 30 m high from sea level. We have calculated at the point where the measurements took place and
06.00-10.00 pm. (peak time 07.00-09.00) pass through an amount of 3.900 vehicles approximately eve
Our detector was placed in the chosen avenue at a distance of 2 km from the seaside, 4 meters above th
and well protected from solar light.
The measurements began in June 2003 and were of continuous radon monitoring for twenty nine mon
small intervals during some windy days.
In this research we take in to consideration accurately the atmospheric parameters, such temperature, h
barometric pressure and more the wind speed and direction daily. The detector filter has been replaced a
to the factory instructions. The official dates of the taxis strike have been collected from the Athens fe
of taxi owners. The values of CO, CO_2, NOX, NO_2, and SO_2 are from the Greek Environment Mi
conclusion we deduct, that the increase number of private cars in circulation (gasoline consumption v
increased immediately, the radon daughters' quantity for an unknown period of permanence in the atm
environment. That must be taken in serious consideration in the future, not only by the medical doc
also by all those scientists who are occupied with the environmental health.