Global environmental hazards are caused mainly by air pollution. The most often and toxic sources of air pollution are carbon dioxide, sulfur dioxide, nitrogen oxides and particulate matter (PM10 and PM2,5). An air pollutant is a gas, solid or liquid substance, which is present in the air in quantities greater than its average content. In accordance to the WHO, polluted air is the air which chemical content may negatively influence human, plant or animal health, and other elements of the environment (water, soil). The air pollution is the most harmful and dangerous environmental hazard because of its capability to move and expand toxicity on a wide-scale to all other environmental elements. Air pollutants are divided into particulate matter, aerosol and gaseous pollutants. A toxic effect of pollutants on human body manifests itself primarily through increased frequency of respiratory diseases, reproductive disorders and allergies. Air pollution also adversely affects plant growth, by disturbing the processes of photosynthesis, transpiration and respiration, increasing the acidity of drinking water, causing corrosion of metals and building materials, contaminating water and soil and influencing global climate change. There are three main types of pollution sources: - point source pollution - mainly emitted by large industrial dust: SO2, NO, CO and heavy metals, - area sources (diffuse) - home emitted pollution, local household furnaces and boiler systems, small industrial plants - emitting mainly particulate matter and SO2, - line source pollution - in particular public transport pollution responsible for the emission of NOx, CO and heavy metals (mainly lead). Environmental monitoring systems provide reliable data from measurements, assessments and forecasts of the state of the environment. These systems are also responsible for collecting, processing and disseminating information on the environment. Monitoring data can be used for operational managing of the environment through proceeding assessments of environmental impact, issuing permits for substances or energy introduced to the environment, and implementation of programs and strategies for environmental protection. In addition, information from environmental monitoring can be used to measure effectiveness of actions and strategic planning in the field of environmental protection and sustainable development. The air quality assessment in Poland is realized based on the relevant legislation, which defines the system of air monitoring (the scope and method of trials conduction, the quality of such trials, minimal number of stations, methods and evaluation criteria). In Poland current Regulation of the Minister of Environment of 24 August 2012 concerning evaluation of substances levels in the air (Journal of Laws 2012 item 1031) standardized the limit values, target values, alert levels and ceiling concentration of exposure for certain substances in the air. This instruction is a uniform layout and comprises the following parts: 1.Goal 2.Preparation phase 3.Main activities 4. Student self-activities 5.Guidelines for report preparation 6.Bibliography Goal The aim of the exercise is to perform an analysis of air pollution by cadmium (Cd) and benzo(a)pyrene (B(a)P) contained in particulate matter (PM10), and PM10, for the following regions of Poland: prov. małopolskie (Kraków), prov. pomorskie (Gdańsk), in the period from January 2015 to March 2020. The results from cities areas should be compared with results from one outside the city area. In addition, the exercise should include comparative analysis of air pollution with carbon monoxide for Kraków (Poland) and Edinburgh (United Kingdom) in time range 2015-2020. Upon completion of this exercise student shall fluently navigate various public domain databases focused on monitoring of air pollution in different areas of the globe (especially Poland). Student also will be able to export data from mentioned databases in order to perform own statistical calculations and present results of the analysis in a transparent manner. Preparation phase Student should be familiar with such definitions and issues as environmental monitoring, types of air pollution, limit value and target value of the substance in the air, and should be able to perform simple statistic calculations (arithmetic mean, standard deviation).

In order to carry out the exercise, computer with internet access is required with recommended MS Office™ software (Word, Excel). Following links to air pollution monitoring databases will be used during the exercise: a) polish: Chief Inspectorate for Environmental Protection (pl. Głównego Inspektoratu Ochrony Środowiska (GIOŚ)) http://powietrze.gios.gov.pl/pjp/home Regional Inspectorate for Environmental Protection Krakow (pl. Wojewódzkiego Inspektoratu Ochrony Środowiska Kraków (WIOŚ Kraków)) http://monitoring.krakow.pios.gov.pl/ AIRPOMERANIA System http://airpomerania.pl/ Regional Inspectorate for Environmental Protection Krakow (pl. Wojewódzkiego Inspektoratu Ochrony Środowiska Katowice (WIOŚ Katowice) http://powietrze.katowice.wios.gov.pl/ b) foreign (additional): Department for Environment Food & Rural Affairs (DEFRA)