Data dictionary for ARM dataset

Variables based on results from National Air Toxics Assessment (NATA): <https://www.epa.gov/national-air-toxics-assessment>

Sources include:

* NATA Glossary of Terms: <https://www.epa.gov/national-air-toxics-assessment/nata-glossary-terms>
* NATA Technical Support Document: <https://www.epa.gov/national-air-toxics-assessment/2011-nata-technical-support-document>

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| **Variable**  **(units)** | **Description** |
| State | State in the United States |
| EPA.Region | EPA has ten Regional offices, each of which is responsible for the execution of its programs within several states and territories. |
| County | County in given state in the United States; a county is a political and administrative division of a state, providing certain local governmental services. |
| FIPS | FIPS (Federal Information Processing Standards) are a set of standards that describe document processing, encryption algorithms and other information technology standards for use within non-military government agencies and by government contractors and vendors who work with the agencies |
| Tract | Numeric code designating census tract from U.S. Census Bureau. Census tracts are Land areas defined by the U.S. Census Bureau. Tracts can vary in size but each typically contains about 4,000 residents. Census tracts are usually smaller than 2 square miles in cities, but are much larger in rural areas. |
| Population | Number of people in given census tract |
| Pollutant.Name | Name of chemical |
| Point..includes.railyards..Conc  (air concentrations in µg/m3) | Average concentration from point sources and railyards from National Air Toxics Assessment (NATA). |
| Airport.Conc  (air concentrations in µg/m3) | Average concentration from airport sources from National Air Toxics Assessment (NATA). |
| OR.Lightduty..includes.refueling..Conc  (air concentrations in µg/m3) | Average concentration from on-road light duty mobile sources from National Air Toxics Assessment (NATA); vehicles found on roads and highways (e.g., cars, trucks, buses). |
| OR.Heavyduty.Conc  (air concentrations in µg/m3) | Average concentration from on-road heavy duty mobile sources from National Air Toxics Assessment (NATA); vehicles found on roads and highways (e.g., cars, trucks, buses). |
| NR..no.airports..CMV..locomotives..Conc  (air concentrations in µg/m3) | Concentration from non-road sources from National Air Toxics Assessment (NATA); mobile sources not found on roads and highways (e.g., airplanes, trains, lawn mowers, construction vehicles, farm machinery). |
| NP.10m.ReleaseHeight.Conc  (air concentrations in µg/m3) | Average concentration from non-point sources with 10m release height from National Air Toxics Assessment (NATA). |
| NP.Low.ReleaseHeight.Conc  (air concentrations in µg/m3) | Average concentration from non-point sources with low release height from National Air Toxics Assessment (NATA). |
| ResidentialWoodCombustion..RWC..Conc  (air concentrations in µg/m3) | Average concentration from residential wood combustion sources from National Air Toxics Assessment (NATA). |
| CommercialMarineVessel..CMV..Conc  (air concentrations in µg/m3) | Average concentration from commercial marine vessels from National Air Toxics Assessment (NATA). |
| Biogenics.Conc  (air concentrations in µg/m3) | Average concentration from biogenic sources from National Air Toxics Assessment (NATA). Emissions from natural sources, such as plants and trees. These sources emit formaldehyde, acetaldehyde, and  methanol, as well as large quantities of other non-HAP volatile organic compounds (VOCs). Formaldehyde and  acetaldehyde are key risk drivers in NATA. Biogenic emissions are typically computed using a model which utilizes  spatial information on vegetation and land use and environmental conditions of temperature and solar radiation. In  addition to being a primary source of HAPs, other VOCs emitted by biogenic sources react with anthropogenic  VOCs and NOX to produce secondary-formed HAPs. The NATA biogenics source group includes only the primary  emissions. |
| Fires..ag..prescribed..and.wild..Conc  (air concentrations in µg/m3) | Average concentration from fires from National Air Toxics Assessment (NATA). |
| Secondary.Conc  (air concentrations in µg/m3) | Average concentration due to secondary formation. The process by which chemicals are transformed in the air into other chemicals. When a chemical is transformed, the original HAP no longer exists; it is replaced by one or more chemicals. Compared to the original chemical, the newer reaction products can have more, less, or the same toxicity. Transformations and removal processes affect both the fate of the chemical and its atmospheric persistence. Persistence is important because human exposure to chemical is influenced by the length of time the chemical remains in the atmosphere. Note that in NATA the terms atmospheric transformation and secondary formation are used interchangeably. |
| Background.Conc  (air concentrations in µg/m3) | For NATA, the contributions to outdoor air toxics concentrations resulting from natural sources, persistence in the environment of past years' emissions, and long-range transport from distant sources. Background concentrations could be levels of pollutants that would be found in a particular year, even if there had been no recent manmade emissions. Background concentrations are added to the AERMOD concentrations but not to the CMAQ modeled concentrations which account for long range transport and emissions from outside the domain through boundary conditions. The vast majority of risk from the NATA background concentrations is from carbon tetrachloride, a ubiquitous pollutant that has few sources of emissions but is persistent due to its long half-life. |
| Total.Conc  (air concentrations in µg/m3) | Total average concentration of a given chemical from all source types; from NATA. |
| Point..includes.railyards..Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from point sources and railyards from National Air Toxics Assessment (NATA). |
| Airport.Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from airport sources from National Air Toxics Assessment (NATA). |
| OR.Lightduty..includes.refueling..Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from on-road light duty mobile sources from National Air Toxics Assessment (NATA); vehicles found on roads and highways (e.g., cars, trucks, buses). |
| OR.Heavyduty.Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from on-road heavy duty mobile sources from National Air Toxics Assessment (NATA); vehicles found on roads and highways (e.g., cars, trucks, buses). |
| NR..no.airports..CMV..locomotives..Exposure.Conc  (exposure concentrations in µg/m3) | Exposure concentration from non-road sources from National Air Toxics Assessment (NATA); mobile sources not found on roads and highways (e.g., airplanes, trains, lawn mowers, construction vehicles, farm machinery). |
| NP.10m.ReleaseHeight.Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from non-point sources with 10m release height from National Air Toxics Assessment (NATA). |
| NP.Low.ReleaseHeight.Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from non-point sources with low release height from National Air Toxics Assessment (NATA). |
| ResidentialWoodCombustion..RWC..Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from residential wood combustion sources from National Air Toxics Assessment (NATA). |
| CommercialMarineVessel..CMV..Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from commercial marine vessels from National Air Toxics Assessment (NATA). |
| Biogenics.Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from biogenic sources from National Air Toxics Assessment (NATA). Emissions from natural sources, such as plants and trees. These sources emit formaldehyde, acetaldehyde, and  methanol, as well as large quantities of other non-HAP volatile organic compounds (VOCs). Formaldehyde and  acetaldehyde are key risk drivers in NATA. Biogenic emissions are typically computed using a model which utilizes  spatial information on vegetation and land use and environmental conditions of temperature and solar radiation. In  addition to being a primary source of HAPs, other VOCs emitted by biogenic sources react with anthropogenic  VOCs and NOX to produce secondary-formed HAPs. The NATA biogenics source group includes only the primary  emissions. |
| Fires..ag..prescribed..and.wild..Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration from fires from National Air Toxics Assessment (NATA). |
| Secondary.Exposure.Conc  (exposure concentrations in µg/m3) | Average exposure concentration due to secondary formation. The process by which chemicals are transformed in the air into other chemicals. When a chemical is transformed, the original HAP no longer exists; it is replaced by one or more chemicals. Compared to the original chemical, the newer reaction products can have more, less, or the same toxicity. Transformations and removal processes affect both the fate of the chemical and its atmospheric persistence. Persistence is important because human exposure to chemical is influenced by the length of time the chemical remains in the atmosphere. Note that in NATA the terms atmospheric transformation and secondary formation are used interchangeably. |
| Background.Exposure.Conc  (exposure concentrations in µg/m3) | For NATA, the contributions to outdoor air toxics exposure concentrations resulting from natural sources, persistence in the environment of past years' emissions, and long-range transport from distant sources. Background concentrations could be levels of pollutants that would be found in a particular year, even if there had been no recent manmade emissions. Background concentrations are added to the AERMOD concentrations but not to the CMAQ modeled concentrations which account for long range transport and emissions from outside the domain through boundary conditions. The vast majority of risk from the NATA background concentrations is from carbon tetrachloride, a ubiquitous pollutant that has few sources of emissions but is persistent due to its long half-life. |
| Total.Exposure.Conc  (exposure concentrations in µg/m3) | Total average exposure concentration of a given chemical from all source types; from NATA. |
| Point..includes.railyards..Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from point sources and railyards from National Air Toxics Assessment (NATA). |
| Airport.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from airport sources from National Air Toxics Assessment (NATA). |
| OR.Lightduty..includes.refueling..Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average exposure concentration from on-road light duty mobile sources from National Air Toxics Assessment (NATA); vehicles found on roads and highways (e.g., cars, trucks, buses). |
| OR.Heavyduty.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from on-road heavy duty mobile sources from National Air Toxics Assessment (NATA); vehicles found on roads and highways (e.g., cars, trucks, buses). |
| NR..no.airports..CMV..locomotives..Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Cancer risk from non-road sources from National Air Toxics Assessment (NATA); mobile sources not found on roads and highways (e.g., airplanes, trains, lawn mowers, construction vehicles, farm machinery). |
| NP.10m.ReleaseHeight.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from non-point sources with 10m release height from National Air Toxics Assessment (NATA). |
| NP.Low.ReleaseHeight.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from non-point sources with low release height from National Air Toxics Assessment (NATA). |
| ResidentialWoodCombustion..RWC..Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from residential wood combustion sources from National Air Toxics Assessment (NATA). |
| NR.CommercialMarineVessel..CMV..Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from commercial marine vessels from National Air Toxics Assessment (NATA). |
| Biogenics.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from biogenic sources from National Air Toxics Assessment (NATA). Emissions from natural sources, such as plants and trees. These sources emit formaldehyde, acetaldehyde, and  methanol, as well as large quantities of other non-HAP volatile organic compounds (VOCs). Formaldehyde and  acetaldehyde are key risk drivers in NATA. Biogenic emissions are typically computed using a model which utilizes  spatial information on vegetation and land use and environmental conditions of temperature and solar radiation. In  addition to being a primary source of HAPs, other VOCs emitted by biogenic sources react with anthropogenic  VOCs and NOX to produce secondary-formed HAPs. The NATA biogenics source group includes only the primary  emissions. |
| Fires..ag..prescribed..and.wild..Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk from fires from National Air Toxics Assessment (NATA). |
| Secondary.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Average cancer risk due to secondary formation. The process by which chemicals are transformed in the air into other chemicals. When a chemical is transformed, the original HAP no longer exists; it is replaced by one or more chemicals. Compared to the original chemical, the newer reaction products can have more, less, or the same toxicity. Transformations and removal processes affect both the fate of the chemical and its atmospheric persistence. Persistence is important because human exposure to chemical is influenced by the length of time the chemical remains in the atmosphere. Note that in NATA the terms atmospheric transformation and secondary formation are used interchangeably. |
| Background.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | For NATA, the contributions to outdoor air toxics cancer risk resulting from natural sources, persistence in the environment of past years' emissions, and long-range transport from distant sources. Background concentrations could be levels of pollutants that would be found in a particular year, even if there had been no recent manmade emissions. Background concentrations are added to the AERMOD concentrations but not to the CMAQ modeled concentrations which account for long range transport and emissions from outside the domain through boundary conditions. The vast majority of risk from the NATA background concentrations is from carbon tetrachloride, a ubiquitous pollutant that has few sources of emissions but is persistent due to its long half-life. |
| Total.Cancer.Risk..per.million.  (estimated incremental lifetime cancer risk for an individual as a result of exposure to  a specific air toxic, unitless (expressed as a probability)) | Total average cancer risk of a given chemical from all source types; from NATA. |
| Total.Respiratory.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to respiratory system |
| Total.Neurological.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to neurological system |
| Total.Liver.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to liver as a target organ |
| Total.Developmental.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to developmental system |
| Total.Reproductive.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to reproductive system |
| Total.Kidney.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to kidneys as a target organ |
| Total.Ocular.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to ocular system |
| Total.Endocrine.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to endocrine system |
| Total.Hematological.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to hematological system |
| Total.Immunological.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to immune system |
| Total.Skeletal.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to skeletal system |
| Total.Spleen.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to spleen as target organ |
| Total.Thyroid.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to thyroid system |
| Total.Wholebody.HI  (the hazard quotient for an individual air toxic, unitless; equal to the estimate of long-term inhalation exposure concentration for a specific air toxic, in units of mg/m3 divided by the corresponding reference concentration for that air toxic, in units of mg/m3) | Total non-cancer risk to whole body |
| Chemical.Name | Name of chemical |