

International Agreements, Domestic Laws, and Regulations

How observations and modeling
contribute to these frameworks

U.S. Clean Air Act Timeline

- ▶ The 1955 Air Pollution Control Act was the first U.S federal legislation that pertained to air pollution; it also provided funds for federal government research of air pollution.
- ▶ The first federal legislation to actually pertain to "controlling" air pollution was the Clean Air Act of 1963. The 1963 act accomplished this by establishing a federal program within the U.S. Public Health Service and authorized research into techniques for monitoring and controlling air pollution.
- ▶ In 1967, the Air Quality Act enabled the federal government to increase its activities to investigate enforcing interstate air pollution transport, and, for the first time, to perform far-reaching ambient monitoring studies and stationary source inspections. The 1967 act also authorized expanded studies of air pollutant emission inventories, ambient monitoring techniques, and control techniques.
- ▶ The 1970 amendments greatly expanded the federal mandate. Four major regulatory programs affecting stationary sources were initiated: the National Ambient Air Quality Standards (NAAQS), State Implementation Plans (SIPs), New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPs). Furthermore, the enforcement authority was substantially expanded.
- ▶ The Environmental Protection Agency was established on December 2, 1970 for the purpose of consolidating pertinent federal research, monitoring, standard-setting and enforcement activities into one agency that ensures environmental protection.

U.S. Clean Air Act Timeline (Continued)

- ▶ The 1977 Amendments primarily concerned provisions for the Prevention of Significant Deterioration (PSD) of air quality in areas attaining the NAAQS. The 1977 CAAA also contained requirements pertaining to sources in non-attainment areas for NAAQS. A non-attainment area is a geographic area that does not meet one or more of the federal air quality standards. Both of these 1977 CAAA established major preconstruction permit requirements to ensure attainment and maintenance of the NAAQS.
- ▶ The 1990 Amendments addressed acid rain, ozone depletion in the stratosphere, and toxic air pollution, established a national operating permits program for stationary sources, and increased enforcement authority. The amendments also established new auto gasoline reformulation requirements, set Reid vapor pressure (RVP) standards to control evaporative emissions from gasoline, and mandated new gasoline formulations sold from May to September in many states.

Air Quality Models

- ▶ Air quality models use mathematical and numerical techniques to simulate the physical and chemical processes that affect air pollutants as they disperse and react in the atmosphere.
- ▶ Based on inputs of meteorological data and source information like emission rates and stack height, these models are designed to characterize primary pollutants that are emitted directly into the atmosphere and, in some cases, secondary pollutants that are formed as a result of complex chemical reactions within the atmosphere.
- ▶ Some models estimate the impact of single sources on air quality and are used in the CAA permitting process as well as to estimate risks from hazardous air pollutants on surrounding neighborhoods.

Prevention Of Significant Deterioration (PSD) Permits and Increments

- ▶ PSD permits are required for new or modified sources in attainment areas that emit specific levels for a listed pollutant
- ▶ The source must install the best available control technology for that pollutant
- ▶ If the pollutant being controlled is Particulate Matter (PM10, PM2.5 and precursors for PM2.5), Sulfur Dioxide (SO2) or Nitrogen Oxide (NO2), then it must also be below a maximum allowable increase in air quality level (increment)
 - ▶ Class I Area: International Parks; National Wilderness Areas > 5000 acres; National Parks > 6000 acres; and areas redesignated as Class I by a Governor or Tribal Authority
 - ▶ Class II areas - All other areas of the country.
 - ▶ Class III areas - Governor or Tribal government requests higher pollution levels for a particular area of their State.

Air Quality Models

- ▶ Other models are used to estimate the impacts of multiple types of sources (stationary and mobile) and pollutants over a larger geographic area. These models also include chemical reactions included to estimate the formation of Ozone from NO_x and VOCs reacting and the formation of PM_{2.5} from ammonia with sulfur dioxide or nitrogen oxides
- ▶ These models also are used in the U.S. to demonstrate the effectiveness of State Implementation Plan control requirements at achieving the National Ambient Air Quality Standards for Ozone and PM_{2.5}
- ▶ The models are also used to estimate the impact of emissions from one state on another state's air quality.

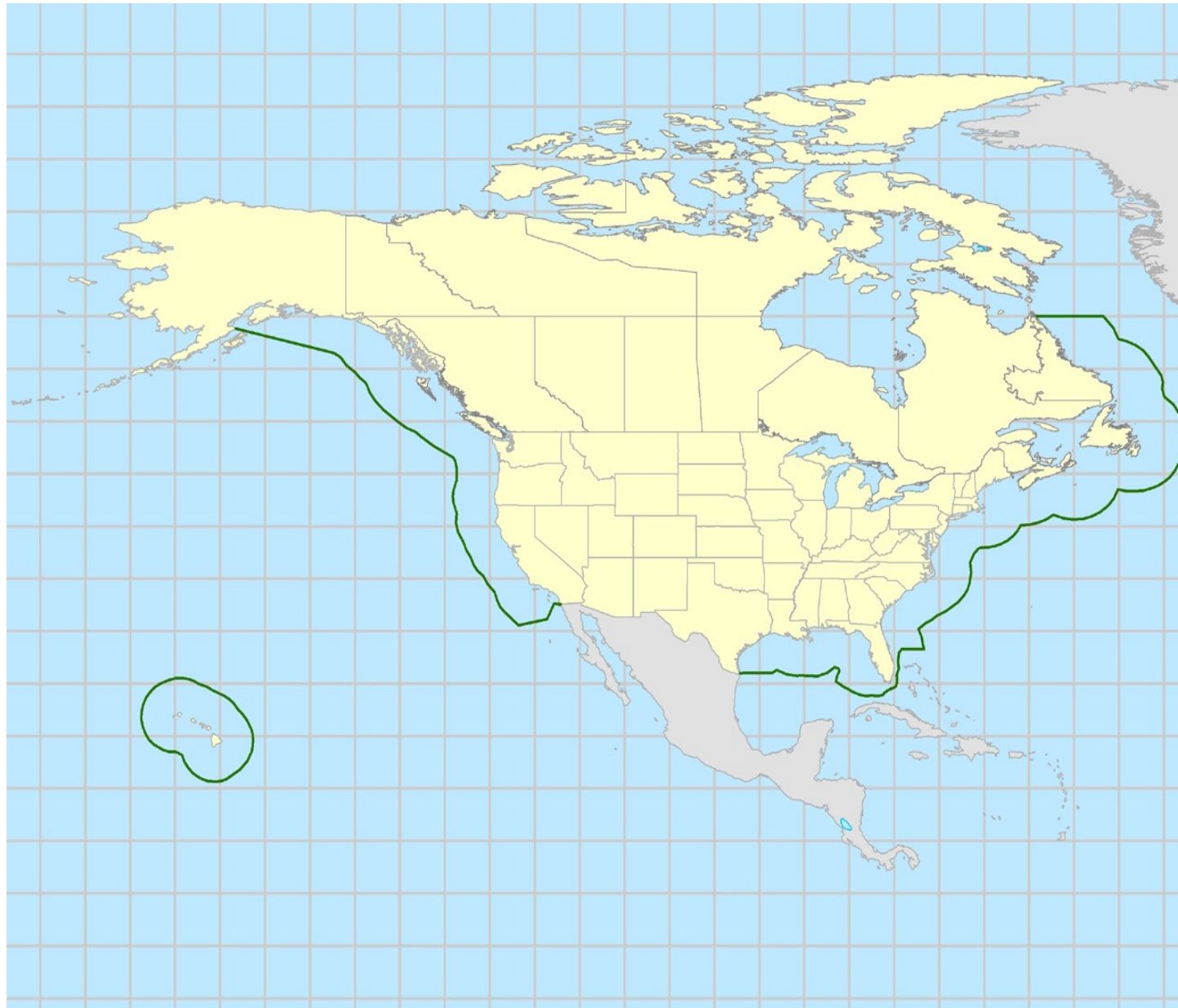
International Air Quality Agreements

- ▶ UN/ECE Convention on Long Range Transboundary Air Pollution 1979
 - ▶ https://www.unece.org/fileadmin/DAM/env/lrtap/ExecutiveBody/35th_session/CLRTAP_Scientific_Assessment_Report_-_Final_20-5-2016.pdf
 - ▶ http://www.unece.org/fileadmin/DAM/env/documents/2016/AIR/Publications/LRTAP_Assessment_Report_-_North_America.pdf
 - ▶ http://www.unece.org/fileadmin/DAM/env/documents/2016/AIR/Publications/02235_AMAP_%E2%80%93_CLRTA_P_Policymakers_Summary_Report_v24_LR.PDF
- ▶ U.S./Canada Air Quality Agreement 1991
 - ▶ Acid Rain
 - ▶ Ozone Annex (2000)
 - ▶ https://www.epa.gov/sites/production/files/2015-07/documents/2014_u.s.-canada_progress_report.pdf
- ▶ UNEA June 2014
 - ▶ The delegates unanimously agreed to encourage governments to set standards and policies across multiple sectors to reduce emissions and manage the negative impacts of air pollution on health, the economy, and overall sustainable development.
 - ▶ The UN Environment Programme (UNEP) was mandated to step up its support to governments through capacity building, the provision of data and assessments and periodic reporting on progress made.

International Air Pollution Agreements

- ▶ The UNECE World Forum for Harmonization of Vehicle Regulations (WP.29) 1958
- ▶ International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL)
 - ▶ International Maritime Organization (IMO) established the possibility for Sulfur Dioxide and Nitrogen Oxide Emission Control Areas (ECAs) in 2005. U.S. and Canada adopted areas covering most of their coast in 2010 and they began enforcement in 2012
- ▶ UNEA
- ▶ International Civil Aviation Organization (ICAO)

North America ECAs



International Air Pollution Agreements

- ▶ Montreal Protocol on Substances that Deplete the Ozone Layer 1989
- ▶ Arctic Council 1996
 - ▶ Enhanced Work Plan on Black Carbon and Methane 2015
- ▶ Climate and Clean Air Coalition 2012
- ▶ Minamata Convention on Mercury 2013
- ▶ U.N. Environment Assembly Air Quality 2014

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