

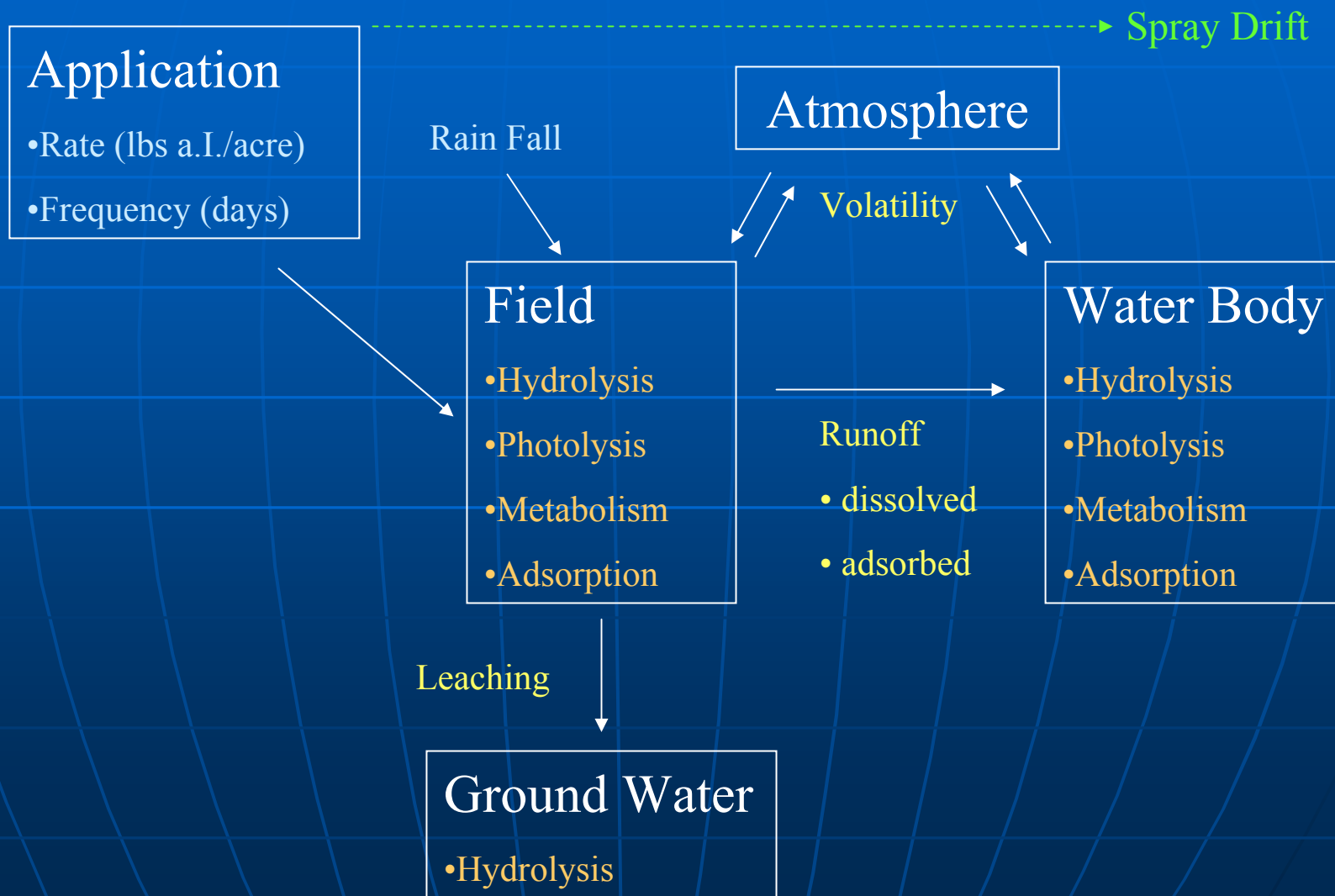
Environmental Fate and Transport Considerations in the Pesticide Registration Process

**James Hetrick, Ph.D.
US EPA Office of Pesticide Programs
Environmental Fate and Effects
Division**

Environmental Fate Data

- Abiotic Degradation
 - Hydrolysis and Photolysis
- Biotic Degradation in Soil and Water/Sediment
 - Aerobic Processes
 - Anaerobic Processes
- Mobility
 - Batch Equilibrium and Soil Column Leaching
 - Volatility
- Field Dissipation Studies
 - Terrestrial
 - Aquatic
 - Forest
- Accumulation in Fish
- Higher Tiered Studies/Special Studies
 - Prospective Ground Water Monitoring
 - Surface Water Runoff Studies (Special Study)

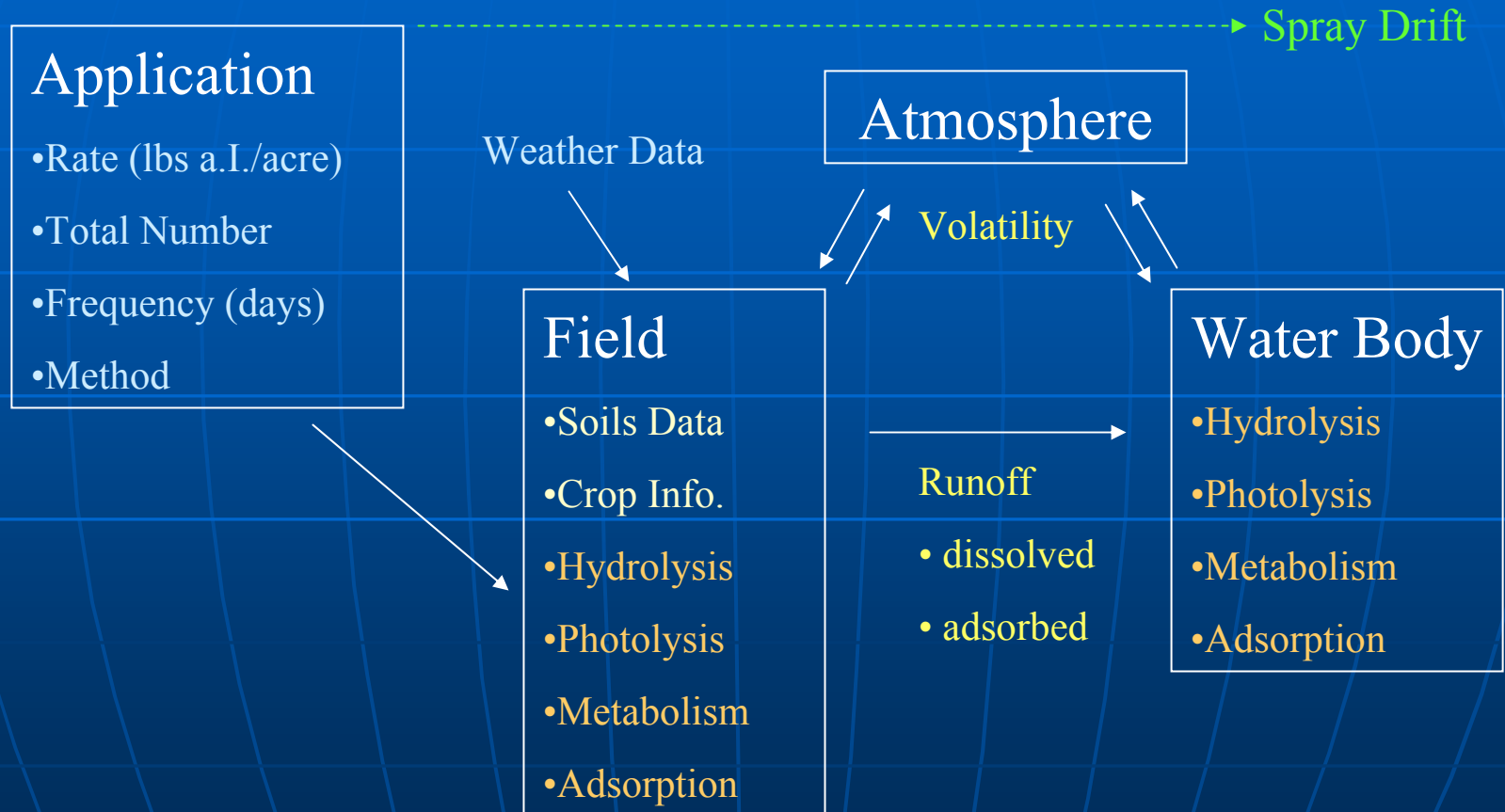
Conceptual Model of Environmental Fate Processes



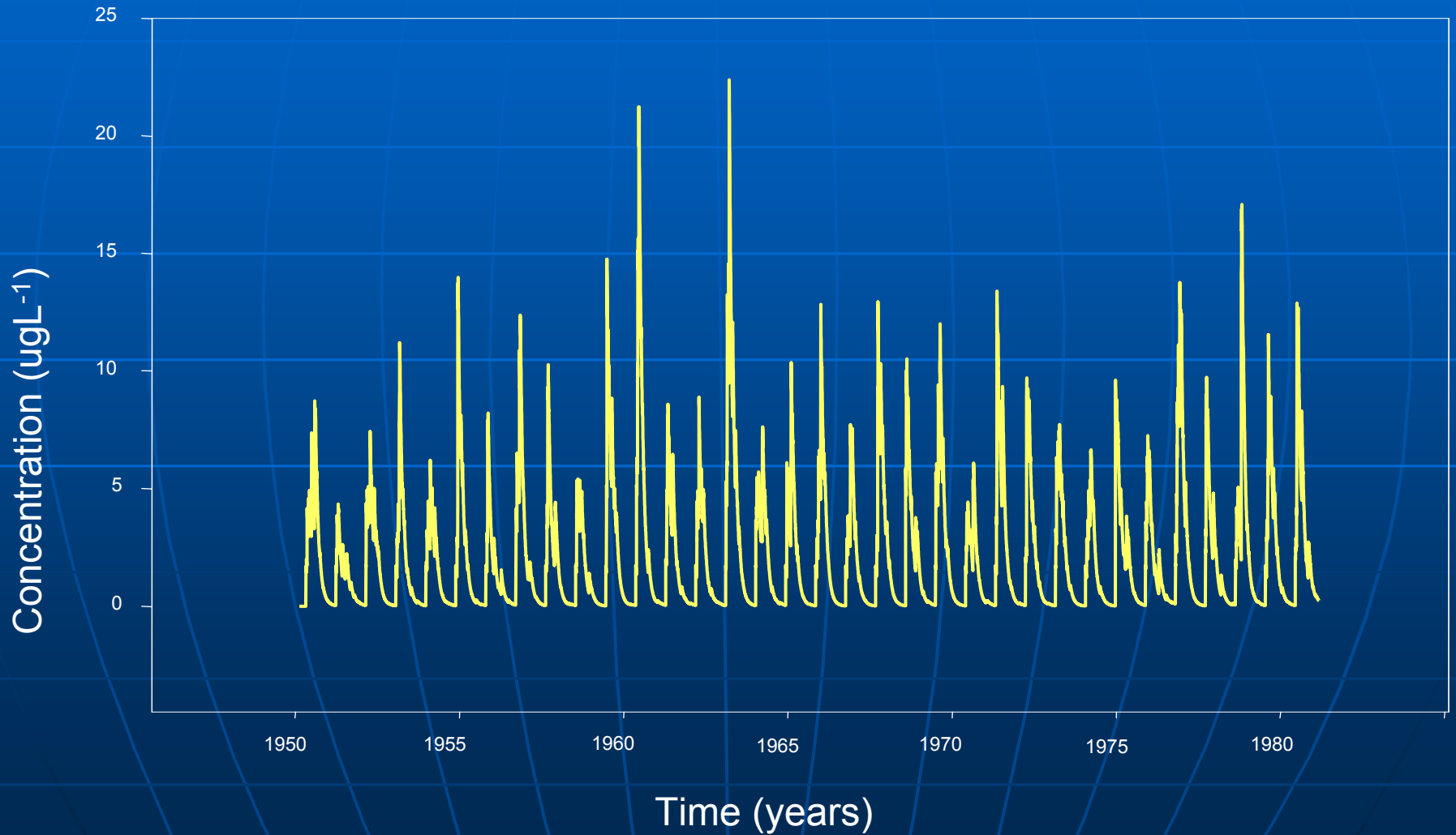
Tiered Modeling System for Ecological and Drinking Water Exposure Assessment

- Tier I
 - SCIGROW – Ground Water
 - FIRST – Surface Water
 - Drinking Water Reservoir
 - GENECC- Surface Water
 - Static Pond
- Tier II
 - PRZM/EXAMS – Surface Water
 - Note: No Tier II GW model

PRZM-EXAMS



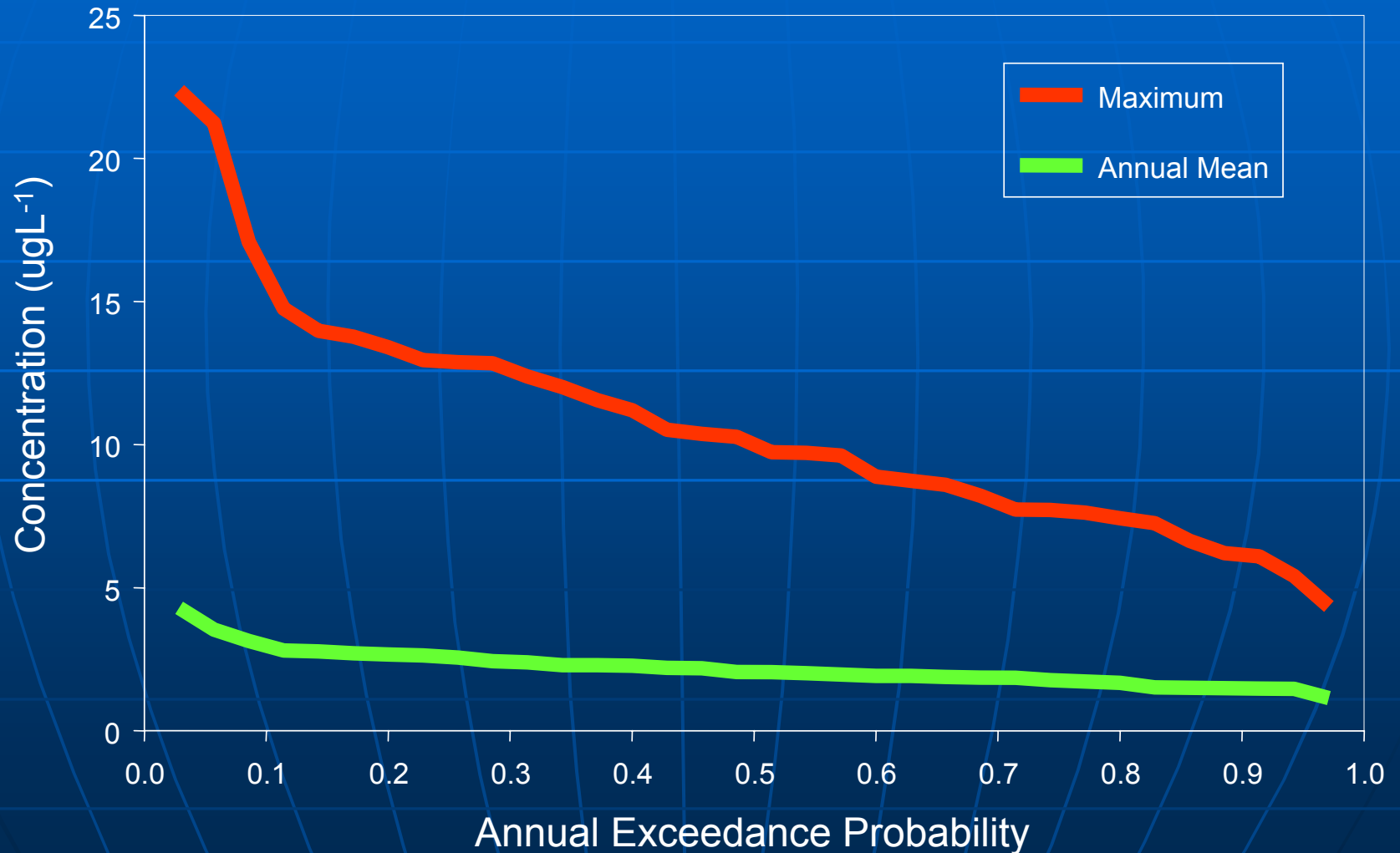
Daily Time Series



Exposure Endpoints

- Drinking Water
 - Daily Peak Concentration (1 in 10 year)
 - Annual Average Concentration (1 in 10 year)
 - 30 year Average Concentration
- Aquatic Exposure
 - Daily Peak Concentration (1 in 10 year)
 - 21-day Average Concentration (1 in 10 year)
 - 60-day Average Concentration (1 in 10 year)

Annual Exceedance Probability



Other Modeling Considerations

- Drinking Water
 - Percent Crop Treated Factor
 - Address assumption of 100% of watershed is treated with pesticide
 - Water Treatment Effects
 - Modeling does not consider water treatment effects on pesticide removal and transformation

Monitoring Data

- Agency makes use of all monitoring data it is aware of.
- Data sources include federal, state, academic, and other sources.
- Data varies tremendously in quality.
- How the data is used depends upon the nature of the data.
- Ancillary data enables data interpretation.

Source of Monitoring Data

- Federal Agencies
 - U. S. Geological Survey
 - NAWQA
 - Toxic Substances Hydrology Program
 - NASQAN
 - EPA
 - SDWIS
 - OW Compliance Data
 - STORET
 - USGS/EPA Reservoir Monitoring
- State Agencies
- Registrants
- Open Literature