Response Planning for Extreme Air Pollution Events:

Scenario-specific planning and responses to extreme air pollution events

May 6-7, 2021

National Academies of Sciences, Engineering, and Medicine Standing Committee on Medical and Epidemiological Aspects of Air Pollution on U.S. Government Employees and their Families

Triggers for action

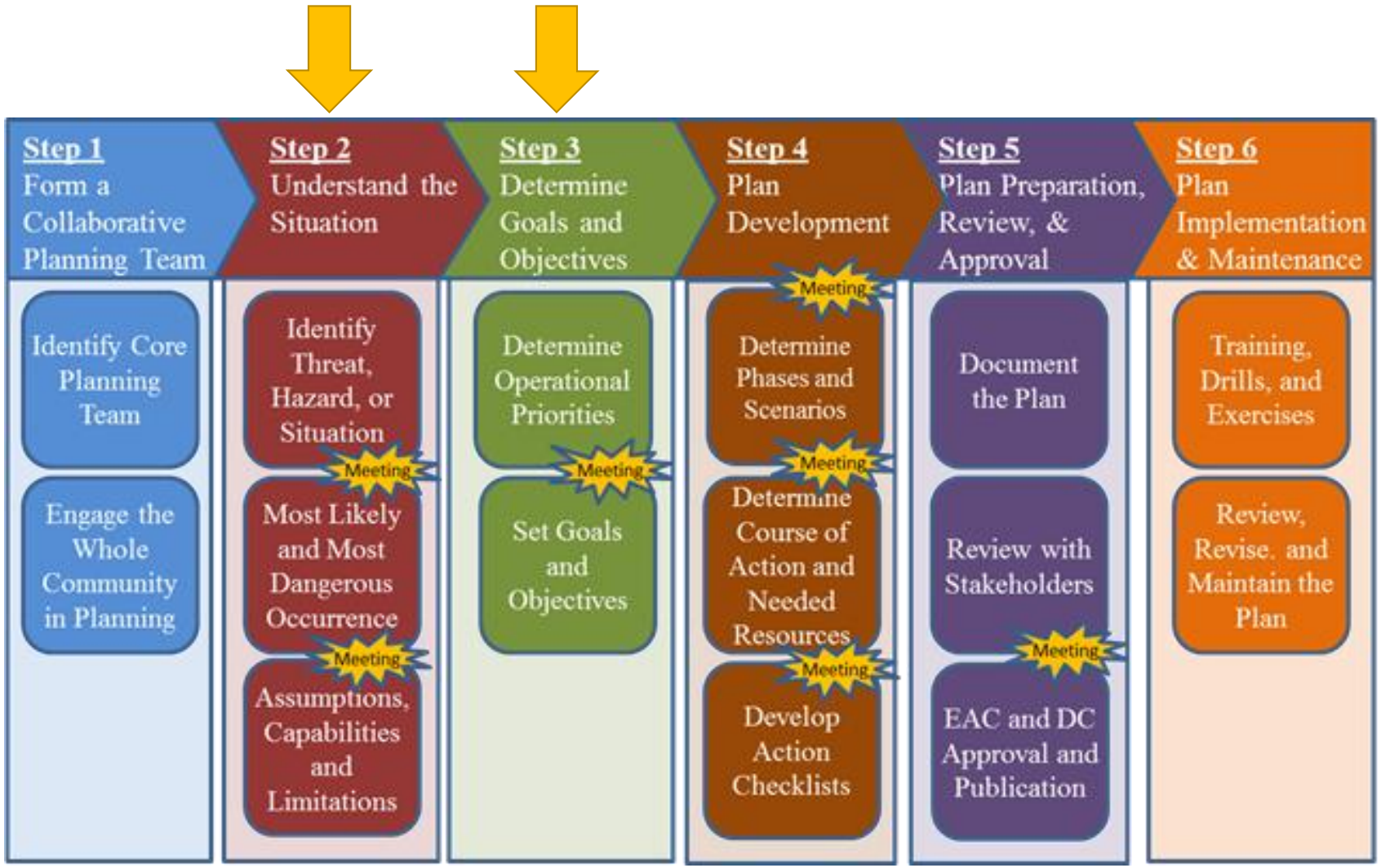
Factors to consider

- Severity and persistence of high air pollution levels
- Forecasted air quality and weather
- Potential health risks
- Increase in health unit visits for respiratory, cardiovascular issues that cannot be managed locally
- Exposure mitigation measures at post and schools
- Imminent danger

Potential triggers

- Several consecutive days of Hazardous AQI
- Inadequate measures to maintain indoor air quality in offices, homes, schools and lack of clean air shelters
- Increase in medical or psychologic symptoms in post community and people in susceptible groups that cannot be adequately addressed locally
- Active fires in post location
- Local government issued a State of Emergency

Triggers in a response plan



Framework for determining response

01

Assess threats, risks, impacts

02

Assess post and host country's capabilities and limitations

03

Determine mitigation measures

04

Define metrics to determine change in situation and risk

Potential management actions

- Nothing
- Engage DOS air pollution experts
- Communications to staff, families, at-risk populations, broader U.S. citizenry
- Notice to limit time outdoors, run/make room air cleaners at home
- Emphasize asthma management plans
- Request/obtain room air cleaners, request indoor air monitoring equipment
- Monitor indoor air quality
- Telework (considerations for locally employed staff)
- Shuttle service for staff
- Cancel off-site meetings
- Implement liberal leave
- Reduce outdoor workshifts, offer N95 respirators to staff who work outdoors
- Recommend schools cancel outdoor activity or cancel school
- Offer N95 respirators to post community – staff and families
- Close specific sections at post, close post
- Shift staff to better indoor air quality areas
- Leave office buildings open for longer
- Leave post

Risk communication tools

- Air quality alerts
- Air quality and actions to take infographic
- Health risks infographic
- MGT notice
- Respiratory protection guidance
- Room air cleaner guidance
- Town hall
- Understanding the U.S. Air Quality Index infographic

Sample Air Quality Alert Email over 500 AQI:

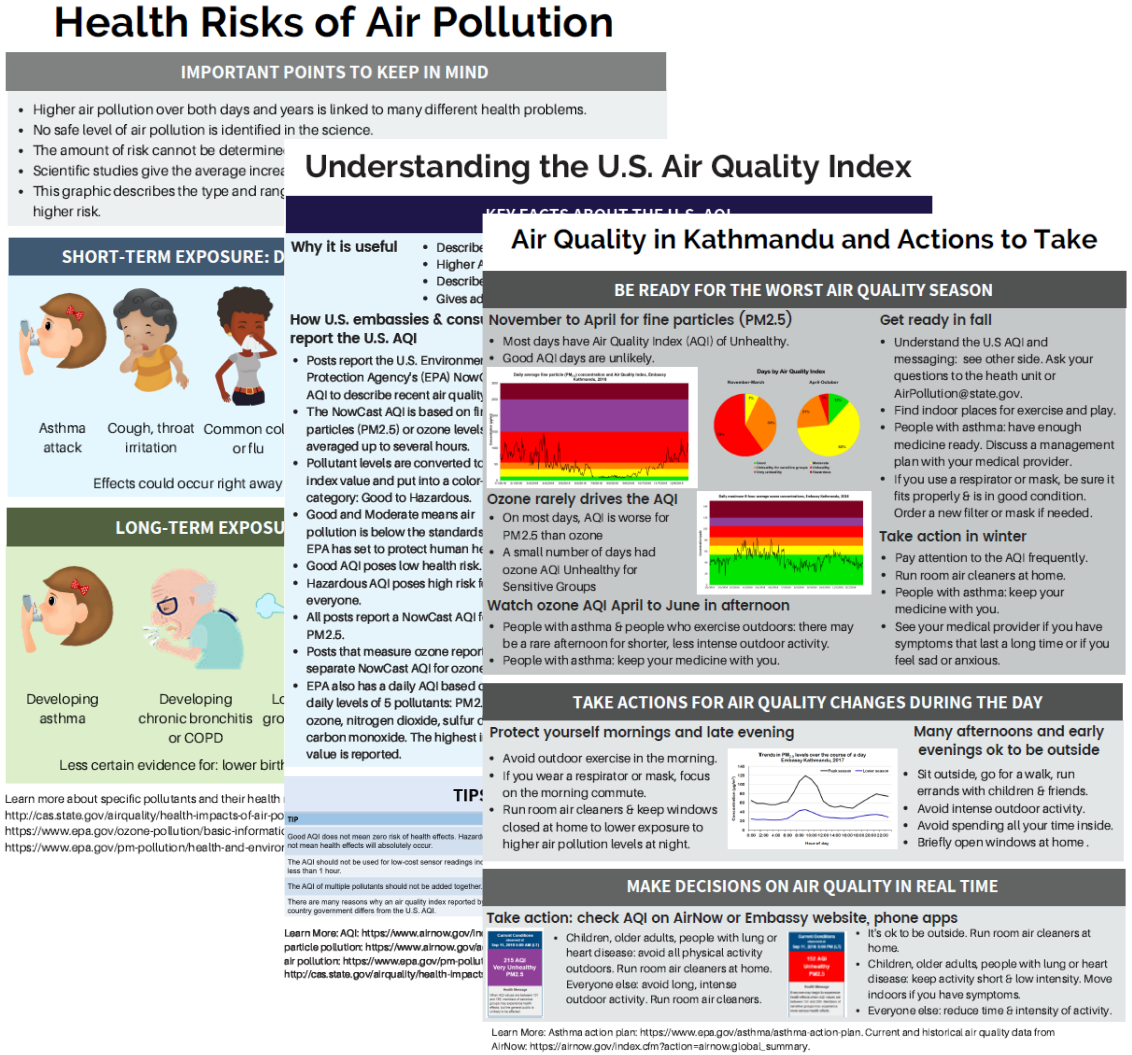
Embassy Colleagues and Community Members:

The Air Quality Index (AQI) has exceeded 500.

According to the Environmental Protection Agency (EPA) recommendations, AQI levels above 500 are considered "beyond index." The EPA recommends that, at AQI levels above 500, everyone should avoid all physical activities outdoors. Individuals with heart or lung disease, older adults, and children are at the greatest risk.

What you should do:

- **Remain indoors** and keep all windows and doors closed tightly.
- **Run your room air cleaners** continuously - on the highest setting where the noise is acceptable.
- **Overnight in occupied bedrooms,** run room air cleaners with the door closed while you sleep.
- **If room air cleaners appear to be malfunctioning or need replacement air filters,** contact: _____.
- **Create clean air rooms** by moving room air cleaners into select rooms, and close off the other rooms. If you have an indoor air quality monitor that measures PM2.5, try to keep PM2.5 from exceeding 35 µg/m3. Remain in this "clean air shelter".
- **Limit any indoor activity that may increase indoor air pollution** such as vacuuming, burning candles, smoking, etc.
- When it is necessary for you to go outside, do so only for short periods, and **consider wearing a well-fitting respirator** with N-95 or higher certification. Avoid all outdoor strenuous physical activities. Review mask guidance here.
- **Keep all vents to outdoors closed and exhaust fans off, except when essential.** Close doors to closets and unused rooms.
- If leaks are apparent, **place barriers**, even a rolled up towel, to reduce air infiltration.
- **Monitor air quality data** before planning any outdoor activity. The website is [...]
- **If you are experiencing health symptoms**, contact the health unit



http://cas.state.gov/airquality/air-pollution-management-checklist/air-quality-communications-library/

Tips for breakout sessions

- Use your moderator for help
- Use slides on management actions and risk communication tools to help answer questions
- We are not looking for a specific, correct answer
- Goal is to work through the process of evaluating an event, forming a decision, understanding the resources available

Fires: wildfires, agricultural burning

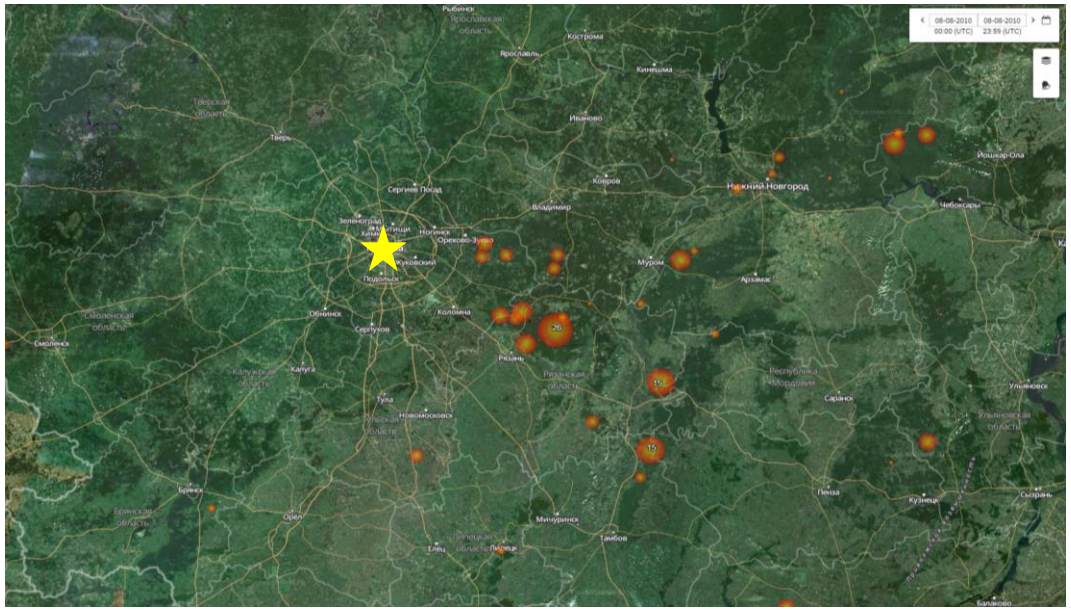
Case study: Moscow peat and bog fires, July-August 2010

Breakout session I

- Objective: evaluate an extreme air pollution event scenario and determine whether triggers are met
- Activity: participants given event/air quality conditions and triggers
- Report out
  - Will the event impact post?
  - Is the event impacting post?
  - How bad is the air quality?
  - Is the bad air quality unusual for post?
  - How long is the poor air quality expected to persist? Will it get worse?
  - What are key uncertainties? Do we know enough?

Breakout session I: are triggers met

Number and location of fires in relation to Moscow



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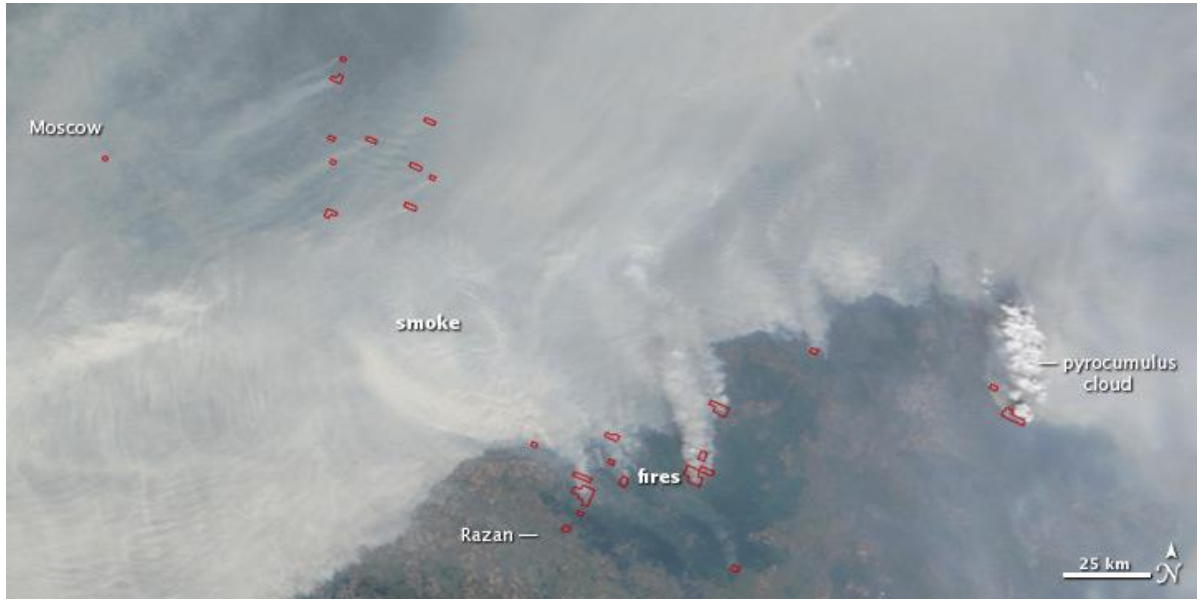
Satellite imagery of smoke plumes



NASA MODIS, 4 August 2010

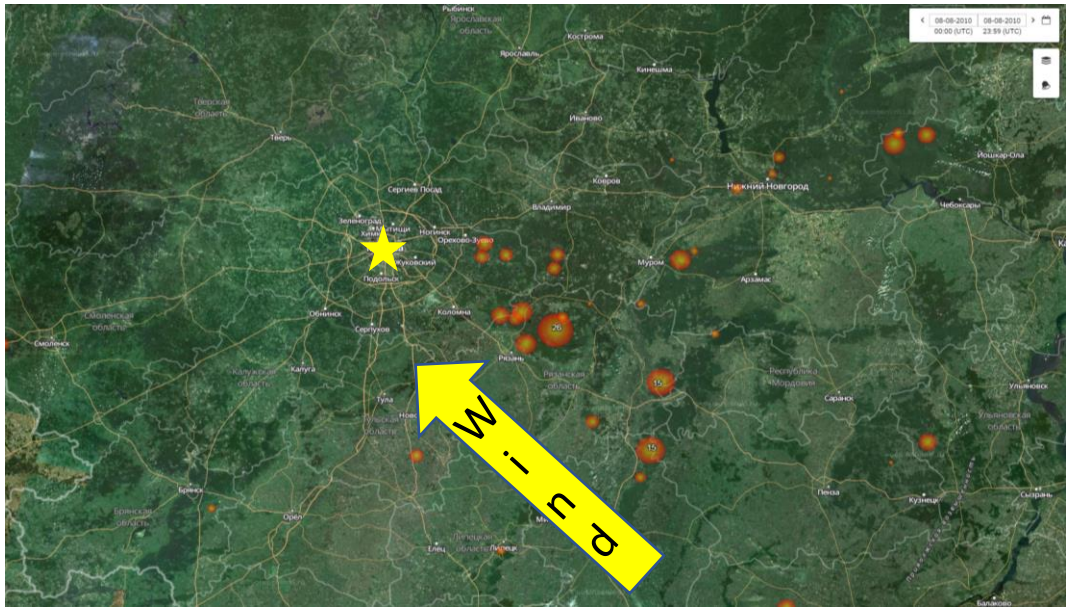
Photos of Red Square, Moscow

New York Times, 6 August 2010

- Fires located 100-400 km from Moscow
- Started late July 2010
- Temperatures much higher than typical conditions (24-31°C)

Breakout session I: are triggers met

Number and location of fires in relation to Moscow



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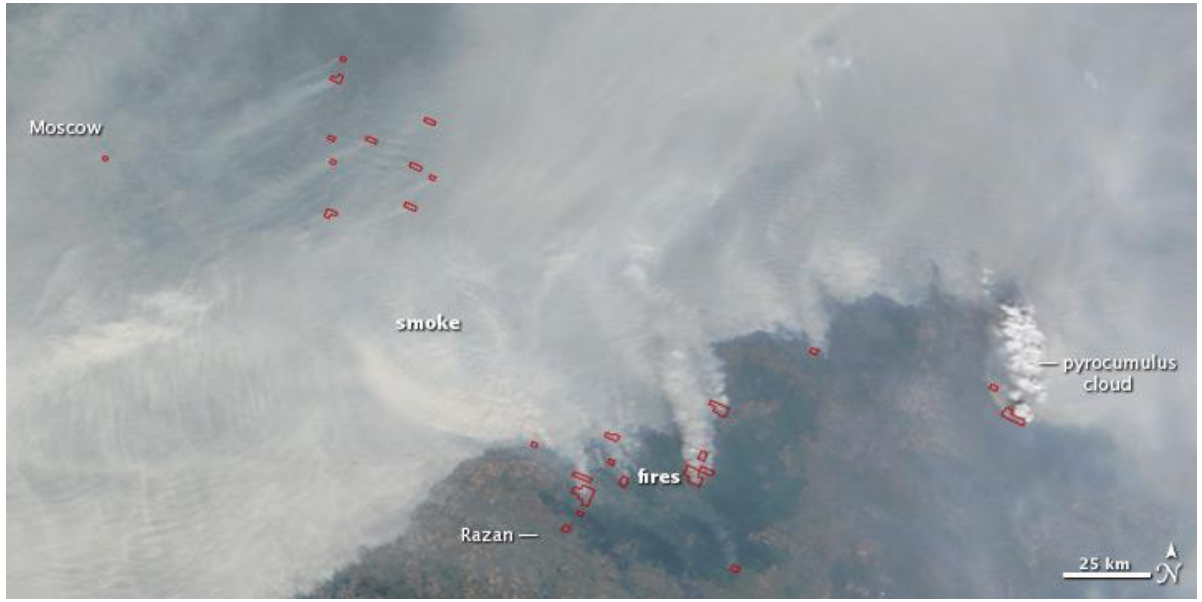


NASA MODIS, 4 August 2010

- Current winds from East-Southeast and Southeast – from the fire location – will carry air pollution toward Moscow
- Winds forecasted to be from East-Southeast and Southeast for several days
- No rain in forecast to wash out pollutants from air

Breakout session I: are triggers met

Inventory of post measures to assess air quality conditions and protective measures

- No publicly available air quality data
- Unverifiable news reports of air quality
- Office building has high-efficiency centralized air filtration system
- No room air cleaners in homes
- No enhanced filtration in international schools
- Post health unit, medical specialists locally available
- N95 respirators available for staff who work outdoors

Breakout session I: Questions to answer

- Will the event impact post?
- Is the event impacting post?
- How bad is the air quality?

Breakout session I: Questions to answer

- Is the bad air quality unusual for post?
- How long is the poor air quality expected to persist? Will it get worse?
- What are key uncertainties? Do we know enough?

Breakout session II

- Objective: evaluate initial conditions and post resources and propose actions and communications
- Activity: participants given event/air quality conditions and list of potential actions
- Report out
  - What actions are recommended? Yes or No?
  - Why?
  - What needs to be communicated and to whom?

Breakout session II: initial assessment and actions

Overview of conditions

- States of emergency declared in some regions
- Moscow air quality worsens – high PM levels reported in media
- No health unit visits for respiratory symptoms

Measures to assess air quality and mitigate exposures

- No publicly available air quality data
- Unverifiable news reports of air quality
- Office building has high-efficiency centralized air filtration system
- No room air cleaners in homes
- No enhanced filtration in international schools
- Post health unit, medical specialists locally available
- N95 respirators available for staff who work outdoors

Breakout session II: Questions to answer

- What actions are recommended? Yes or No?

- Why?

Breakout session II

- What needs to be communicated and to whom?

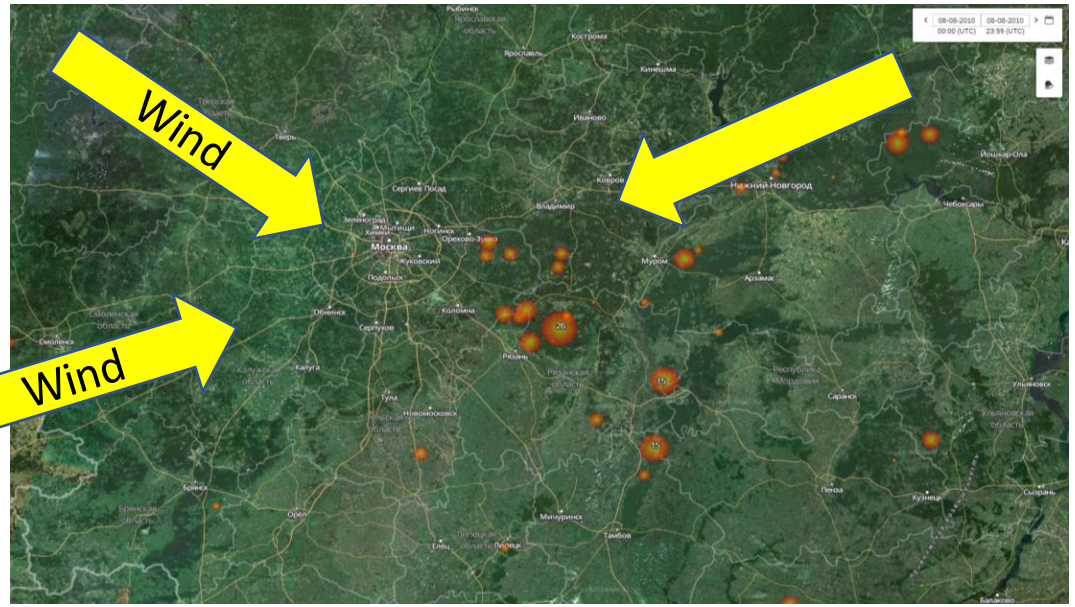
Breakout session III

- Objective: monitor ongoing conditions and decide on follow-up actions
- Activity: participants given updated event/air quality conditions and list of potential actions
- Report out
  - Should actions remain the same?
  - Is an increased response warranted?
  - Should post return to typical operations?
  - Why?
  - What needs to be communicated and to whom?

Breakout session III: follow-up assessment

- Reports that air pollutant levels remain hazardous for 1 week – no public data
- Media reports of carbon monoxide 6.5-fold above limit (4 ppm)
- Increase in health unit visits for respiratory symptoms, asthma, headaches
- 270 new fires since 7 August 2010
- Wind forecasted to be from West-Northwest, West-Southwest, East-Northeast – not from fire location – less air pollution carried toward Moscow
- No rain in forecast to wash out pollutants from the air

Number and location of fires in relation to Moscow



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Breakout session III: Questions to answer

- Should actions remain the same?

- Is an increased response warranted?

Breakout session III: Questions to answer

- Should post return to typical operations?
- Why?
- What needs to be communicated and to whom?