

# IGAC Future Directions

Report from London Workshop (Royal Society, September 2009)

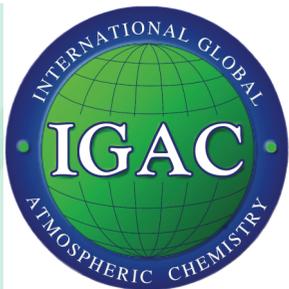




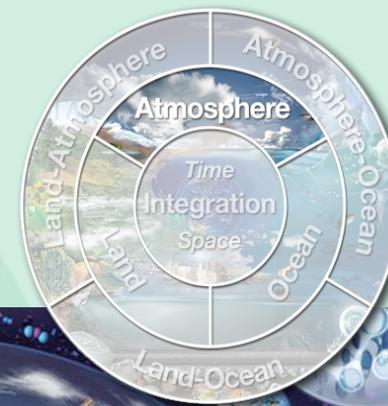
# Background

- **IGBP Phase 2 ends 2012/13 + ICSU reflection about future structure**
- **Examine IGAC science priorities and possible future implementation strategies and structure for coordination of atmospheric chemistry research**
- **First consultation with wider community (London, September 2009)**
  - **Brainstorming on scientific issues & priorities**
  - **Discussion about possible future implementation & programmatic structure**
- **Draft summary note sent to IGBP SC - discussions with IGAC SSC & SPARC (Kyoto)**



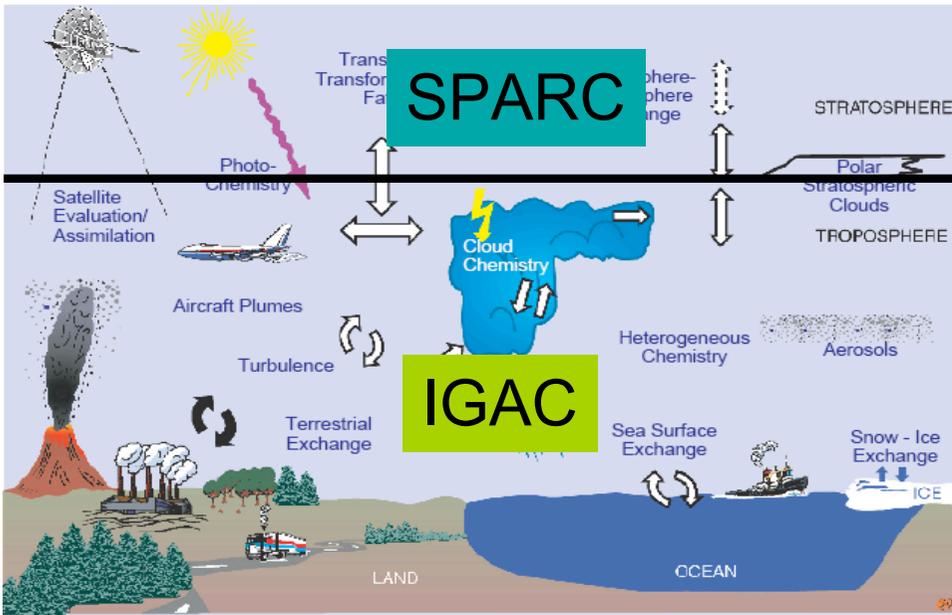


## IGAC Current Science Goals

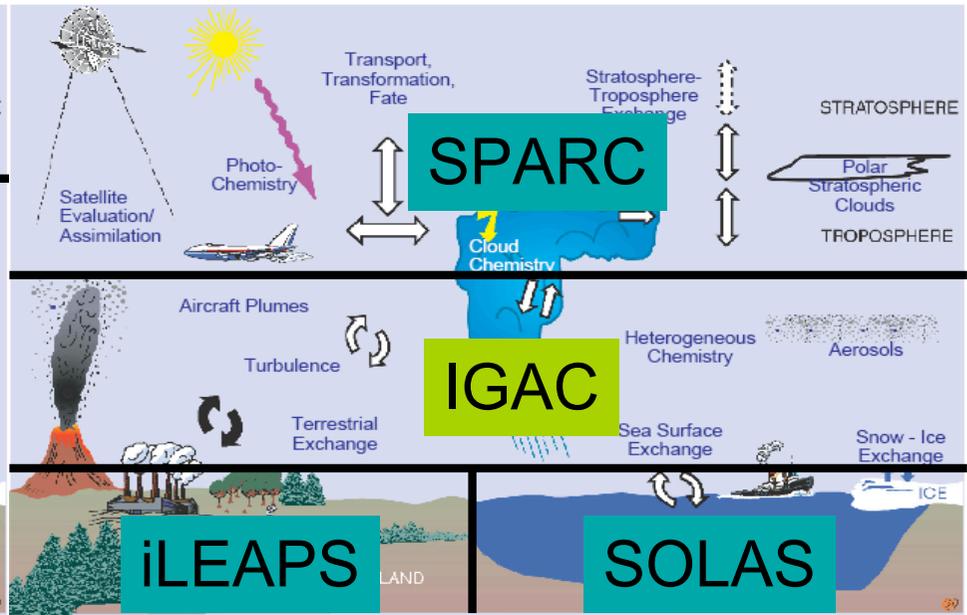


- The role of atmospheric chemistry in climate change.
- Impact of changing emissions, deposition, long-range transport, and transformations on chemical composition and air quality.



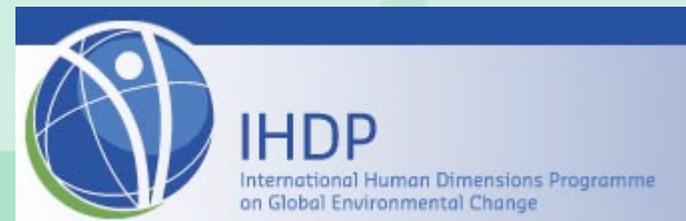


Over-arching projects on emissions, deposition, long-range transport, aerosols, modelling etc.



Combination of tasks (3-4yrs) on specific science (e.g. POLARCAT) & initiatives (e.g. AC&C)

# Current structure - complex!





# London Workshop Summary

Combination of **thematic projects** driven by **social needs** + coordination of **fundamental science** addressing big picture questions (draft):

- How does global environmental change account for changes in atmosphere composition?
- How does the picture change moving from global to regional point of view?
- What is the impact of atmospheric composition change on climate?





# Societal Needs (1)

## **Climate Change (IGBP + ESSP Global Carbon Project + WCRP)**

- Impact of trace gases/ aerosols on climate (past and future trends, regional effects (e.g. Arctic))
- Emissions (past and future projections)
- Aerosol-cloud-precipitation interactions
- Biogeochemical feedbacks (nutrient, carbon cycles)
- Stratosphere-troposphere coupling
- Geo-engineering

## **Air Quality & Health (IHDP)**

- Impact on climate (co-benefits of AQ emission reductions)
- Air pollution - exposure and risk assessment
- Climate impacts on air quality
- Long-range transport of pollutants





# Societal Needs (2)

## **Food production and ecosystems (IGBP, IHDP)**

- Nutrient cycles (carbon/nitrogen cycles)
- Impact of air quality on agricultural production (deposition)

## **Energy (IHDP)**

- Impacts on emissions of current/future technologies (biofuels)

## **Water (ESSP Global Water Project and WCRP GEWEX)**

- Aerosol interactions with hydrological cycle

## **Land-use change (IGBP Global Land Project & AIMES + IHDP)**

- Urbanization, deforestation (fire), emission changes





# Possibilities for Future Implementation (1)

## Thematic programmes addressing societal needs .....

- Air pollution and climate\*
- Troposphere-stratosphere coupling in changing climate\*
- **Aerosols, clouds, precipitation and climate (ACPC)**  
(iLEAPS/IGAC/GEWEX)
- **Emissions (GEIA+)**
- Biogeochemical cycling (SOLAS, iLEAPS ....)
- Air quality and health (megacities, IHDP)

**Role for AC&C+ (IGAC/SPARC) to develop these ideas\* further?**

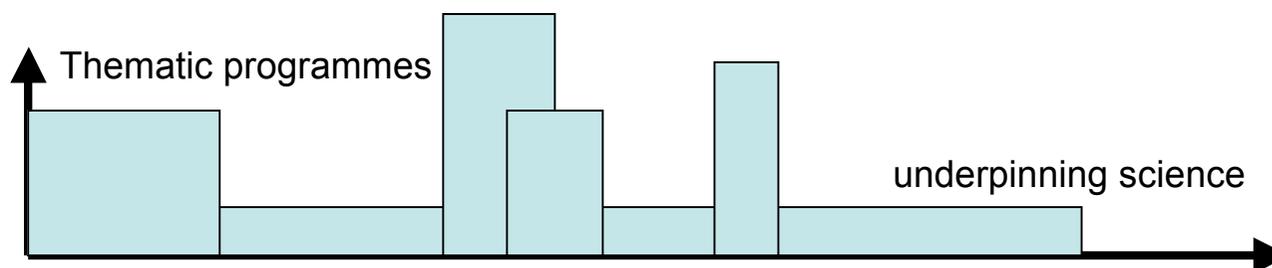


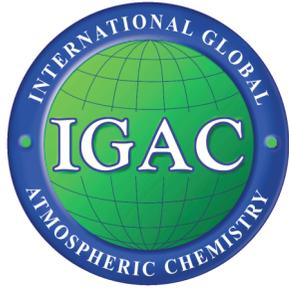


## Possibilities for Future Implementation (2)

**On-going need for programme(s) to coordinate fundamental research and basic needs (how):**

- **Process studies** (emissions, photochemistry, aerosols, dynamics)  
laboratory studies, field experiments and observational techniques
- **Modelling** - improved representation of key processes (all scales)  
models, emissions, data analysis
- **Monitoring composition change** and prediction (chemical weather)  
in light of mitigation/adaptation strategies  
global observing systems





## Future Structure: Possible Options Discussed

- **Stay the same** - IGAC, SPARC etc.
- **Stay the same plus create common coordination structure** for fundamental research related to *Atmospheric Chemistry in the Earth System* (shorter term <2-3yrs)
- **Evolve into new structure with cross-cutting thematic programmes & common coordination (longer term > 5yrs):**
  - Atmospheric composition (pollution) & climate (**AC&C+**)
  - Troposphere-stratosphere coupling
  - Air quality & health
  - Aerosols, clouds, precipitation and climate
  - Emissions + deposition
  - Biogeochemical cycles
  - Regional initiatives
- **Merge into one programme on Atmospheric Chemistry in the Earth System (longer term)**

London summary - mixed opinions but strong support for closer coordination and further discussion (cross-programme WG?):

## Atmospheric Chemistry in the Earth System

