Impact of Air-Sea Exchanges on Air Quality in Coastal Cities

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and

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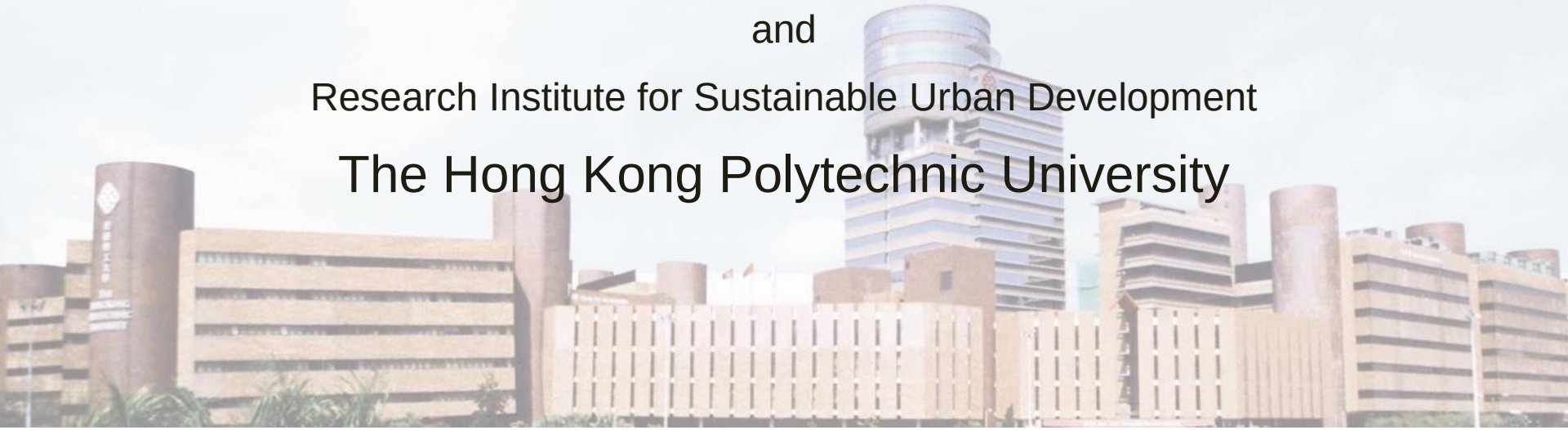
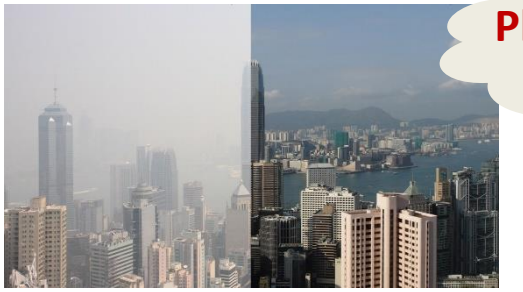
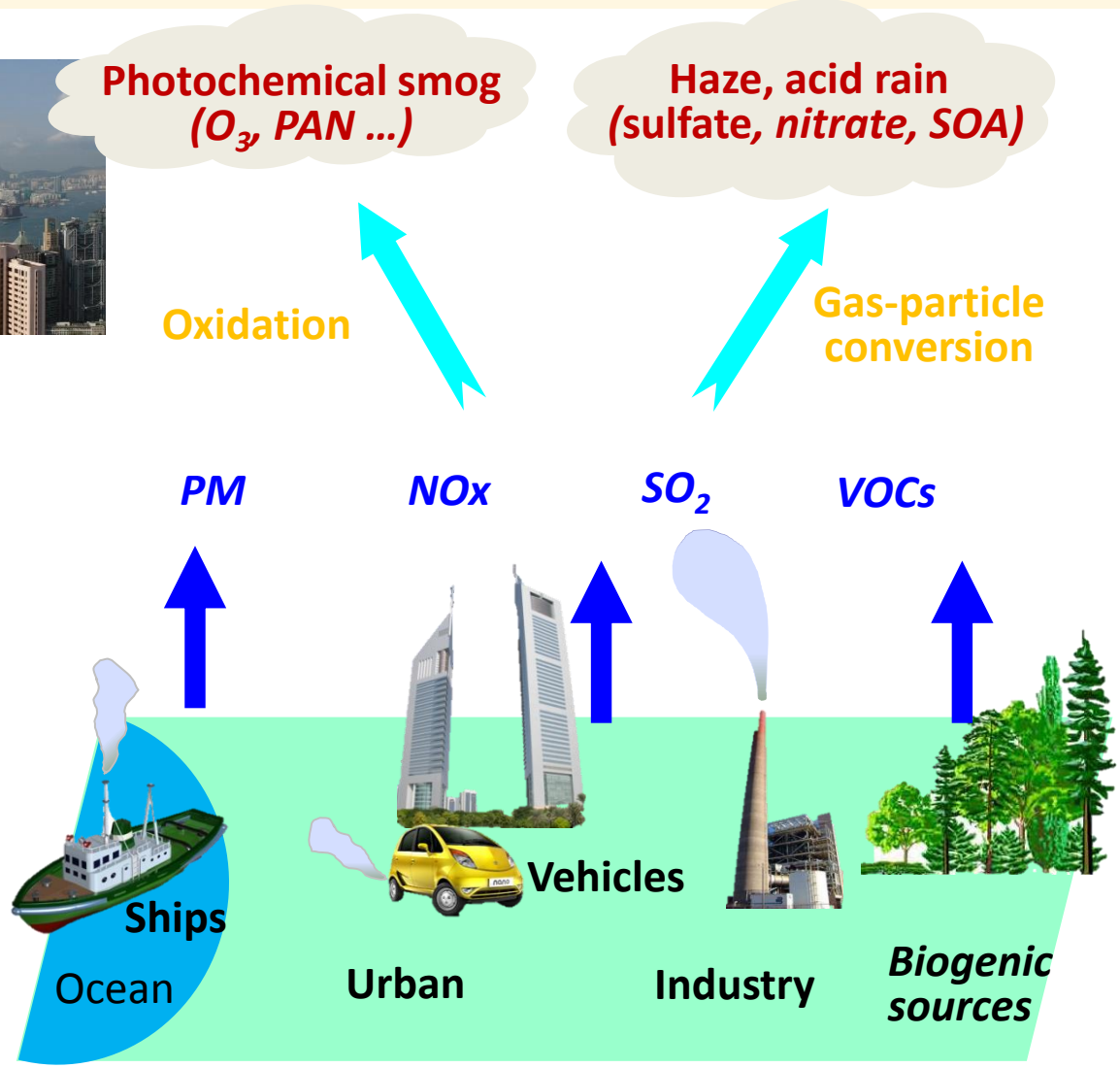


Air pollution – emission, chemistry, and meteorology





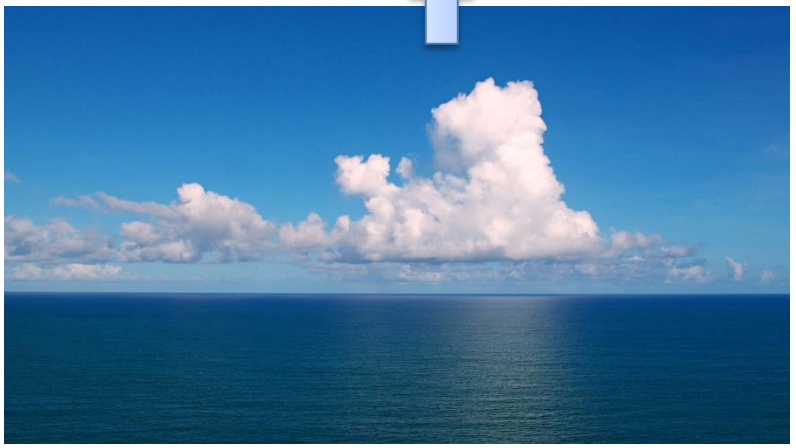
One project is about…

Regional Air Quality

Interaction

Urban air pollution

Marine emissions & surface chem.



Project Team

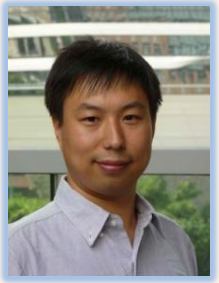
Funded by ANR-RGC Collaborative Research Scheme

Prof. T. Wang (PI)

Coordination

Modeling & Field Studies

HKPolyU



Dr. Z. Wang (Co-I)

Field Studies

HKPolyU

Dr. C. George (PI)

Coordination

Lab studies

IRCELYON - CNRS

Dr. A. Mellouki (Co-I)

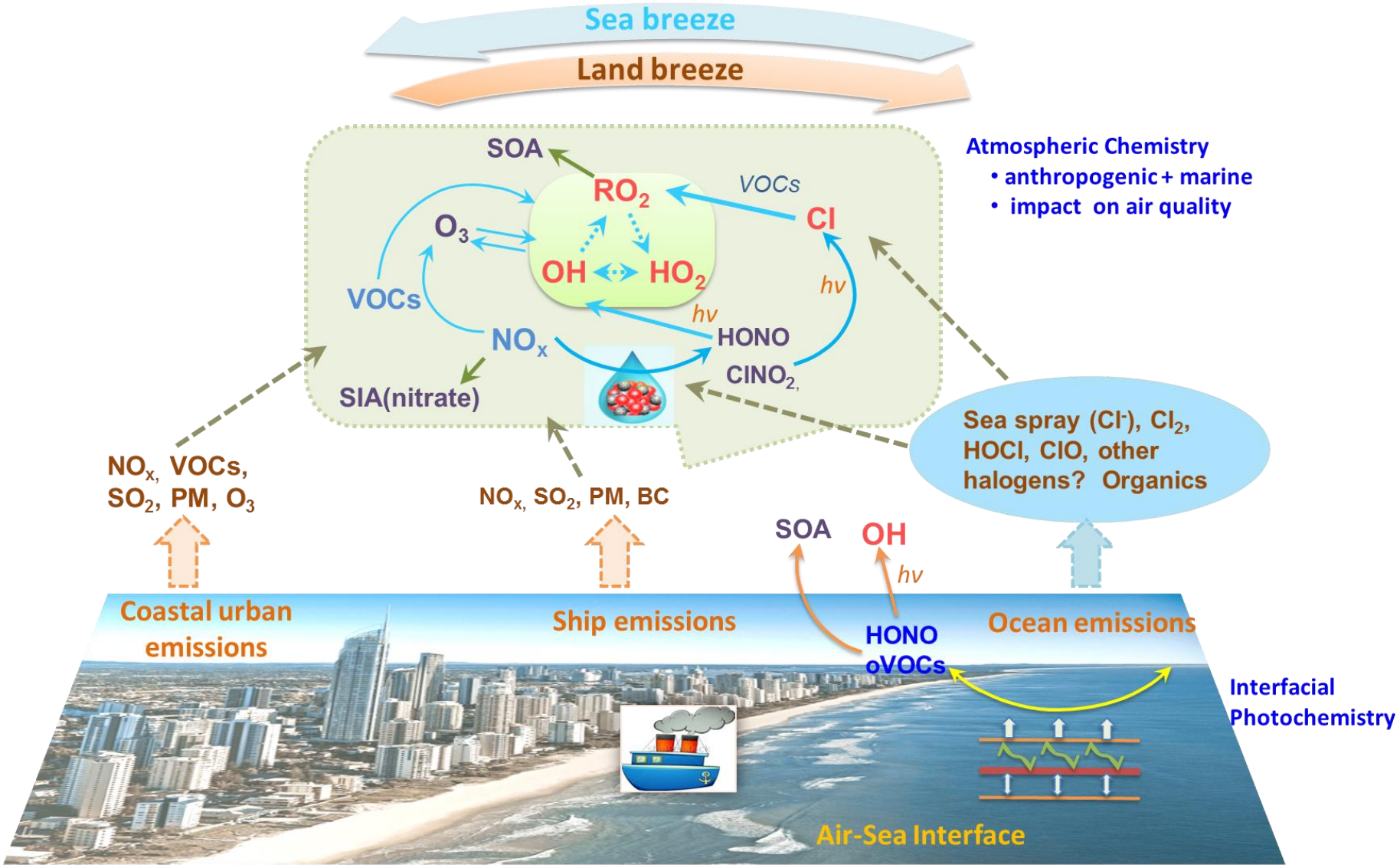
Chamber studies

ICARE - CNRS

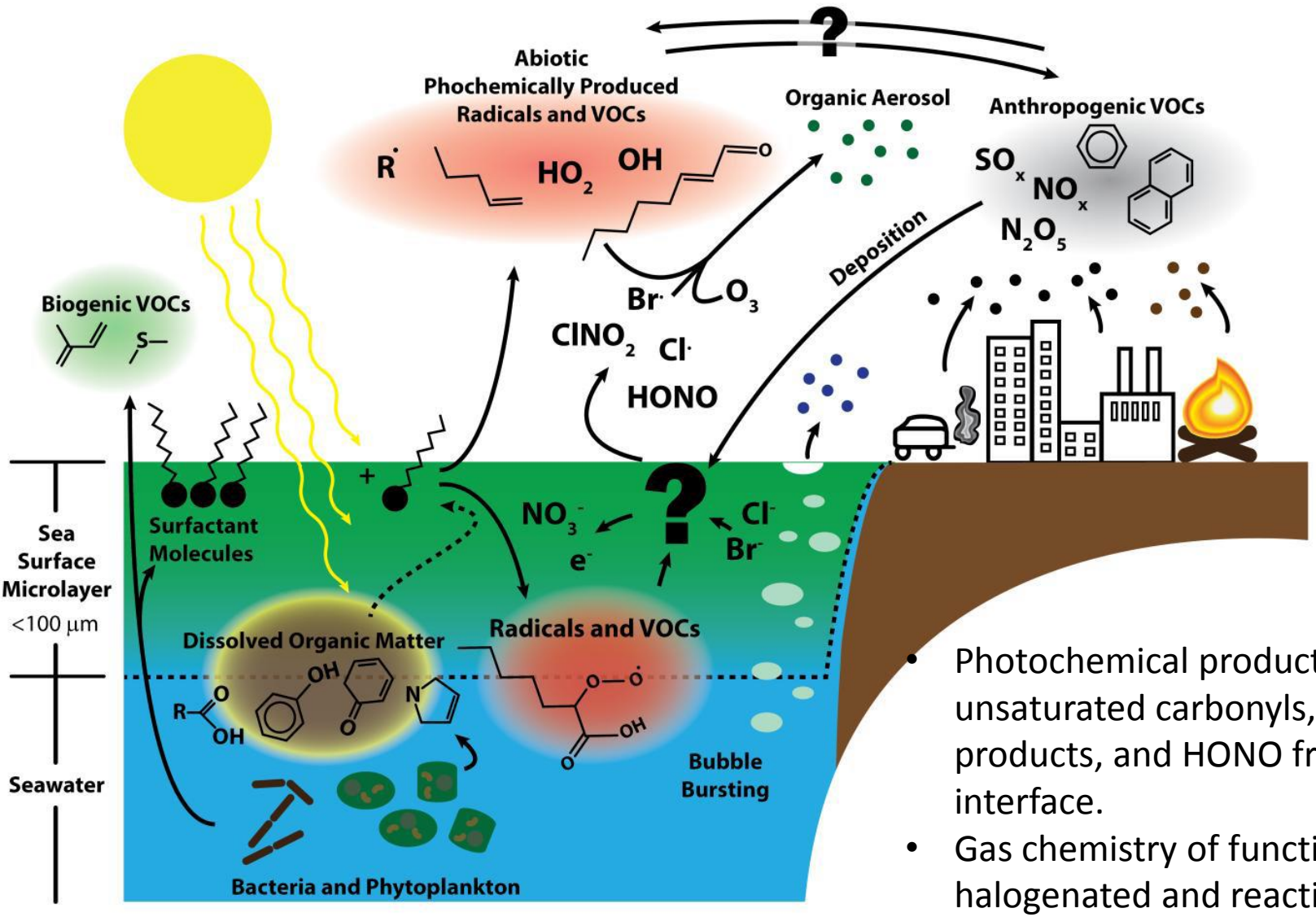
\+ *Several Postdocs and PhDs*

\+ *Several Researchers and Postdocs*

Interaction of urban pollution and marine process



Sea surface microlayer-atmosphere interaction



- Photochemical production of unsaturated carbonyls, halogenated products, and HONO from the air-sea interface.
- Gas chemistry of functionalized/ halogenated and reactive VOCs from air-sea interface and of BVOCs

Open questions:

Q1 What are the organics photochemically produced at the air-sea interface under heavily polluted conditions?

Q2 What is the fate and atmospheric process of these organics, with NOx and halogens, and their impacts on radical budget and secondary pollutants?

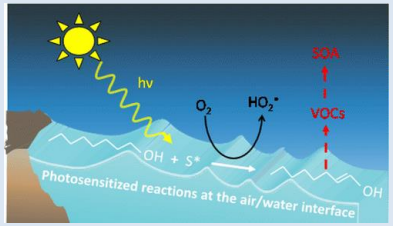
Q3 What are the combined roles of chlorine species, aerosol and organics emitted from oceans and coastal anthropogenic sources in the oxidation processes of polluted marine atmosphere?

Q4 How does the interplay of sea-land breeze circulation and sea-air chemical exchange affects the air quality of coastal cities?

Research Method

Lab Experiments + Field Observations + Modelling

Multiphase chamber simulation



ICARE

Field Observations

PolyU

Outdoor chamber experiment

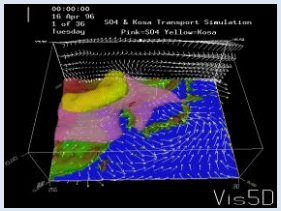
VOCs +
OH, O_3, NO_3,

IRCELYON

Modelling

PolyU

Multi-model & Multi-scale

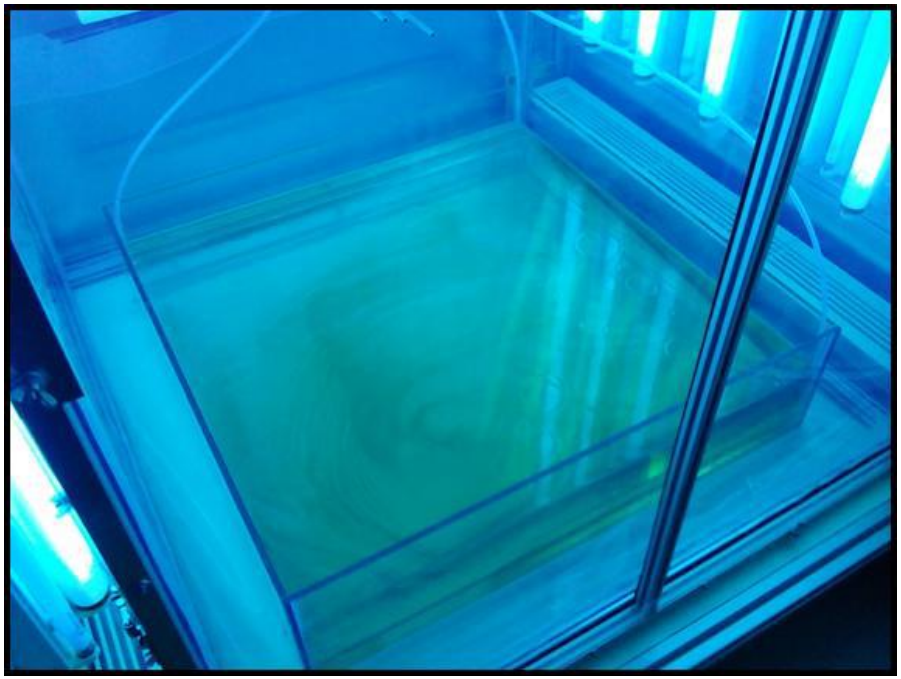


Outdoor Environmental Chamber

- Determination of the kinetics and mechanisms of VOCs oxidation reactions
- Identification and quantification of the gaseous and particulate products

ICARE - CNRS

Interfaces Simulation Chamber



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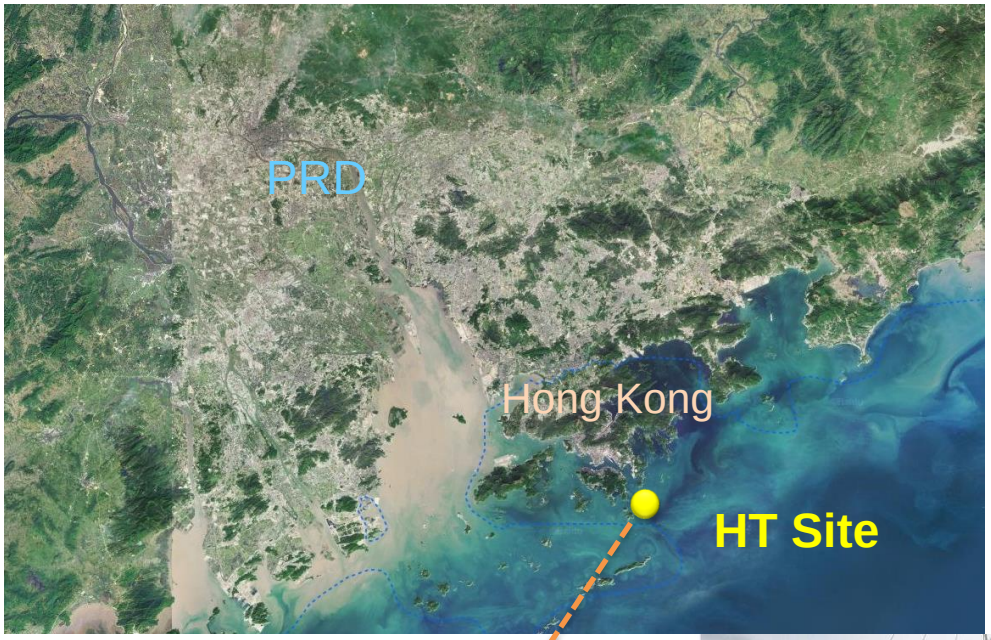
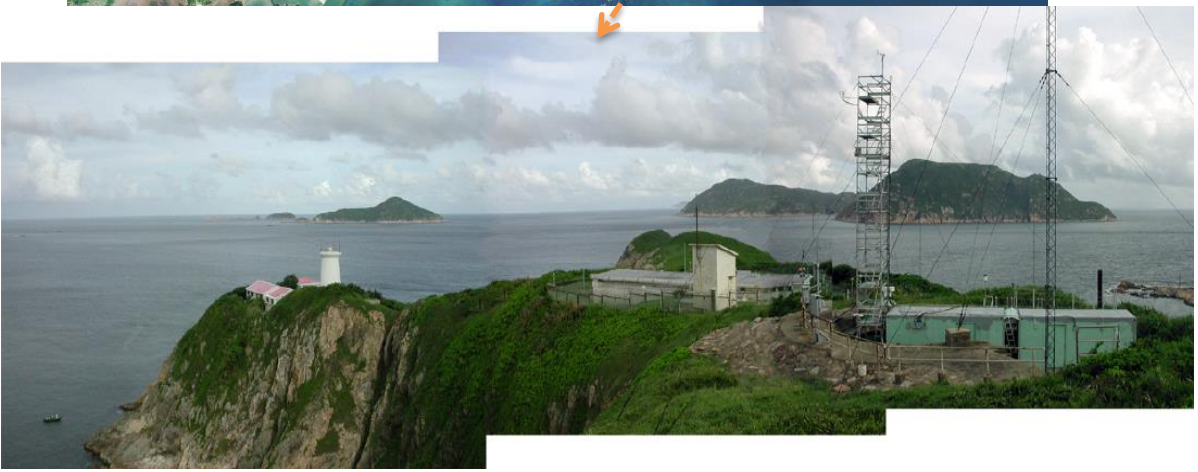
- Investigation of the photosensitized production of radicals precursors under polluted conditions
- Investigation of the catalytic nature of photo-sensitization under polluted conditions

Field observation



- Interplay of pollutants from coastal urban areas, from the ocean surface and from ship emissions
- Identify the effects of sea-air exchange on atmospheric chemistry and air quality



PolyU Atmospheric Research Station at Hok Tsui, Hong Kong

Anticipated outcome

- **New knowledge** in air-sea exchanges and impacts on air quality
- Contribution to **mitigation** of photochemical and haze pollution in coastal cities

Bring back the blue sky!

Thank You!