

Laboratoire Inter-universitaire des Systèmes Atmosphériques



Laboratoire Inter-universitaire des Systèmes Atmosphériques studies the earth atmosphere (atmospheric pollution and climate), the connexion between astrobiology and planetology and the question of the evolution of organic matter towards complex molecular structures, in various planetary environments.

Organisation

LISA (**Laboratoire Inter-universitaire des Systèmes Atmosphériques**) is a joint research unit which supervisory authorities are Centre National de la Recherche Scientifique, Université Paris-Est Créteil and Université Paris Diderot. About 110 people are working at LISA, including about 70 permanent staff members. Activity is mainly located on the site of the Multidisciplinary Center of Creteil.

Research topics

Thematically, the scientific activity of LISA is centered, as its name suggests, on the understanding of atmospheric systems (terrestrial, planets, comets). The study of these systems is addressed both in terms of observation (in situ experiments, satellite observations), process studies (experimental and theoretical simulation) and modeling (mainly 0 and 3D). More specifically, these activities covers five topics of research :

- Oxidative pollution from local to continental scale (including atmospheric impacts on ecosystems and materials)
 - Fate of organic carbon and its impacts
 - Cycle of desert dust
 - Spectroscopy and Atmospheres
 - Exo / Astrobiology: Physical Organic chemistry of planetary environments.
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Major international projects

- **EMPA Observational** composition of the stratosphere and upper troposphere with observations from ENVISAT
 - IASI : chemical composition of the atmosphere from satellite observations METOP
 - **Exploring the Solar System** AMINO experiment, which consist in exposing samples to solar ultraviolet radiation. Those samples are molecules, solid or gaseous mixtures, related to the study of the organic matter in comets, meteorites, Titan's atmosphere and at the surface of Mars.
 - Cassini Huygens : study of Titan
 - Rosetta : study of a comet
 - MSL?11 : study of the surface of Mars
 - Phobos Grunt: study of Phobos, Mars satellite.
 - **Field Campaigns** monsoon study
 - CACHE : study of optical properties of urban aerosols and mixtures of mineral aerosols from the Sahara and pollution over Cairo
 - MEGAPOLI : study of pollution in megacities
 - CHARMEX : component of the major multidisciplinary project to study the Mediterranean environment, and more specifically the chemical composition of the atmosphere, and its impact on regional climate, air quality and biogeochemistry.
 - **Major European projects** change of atmospheric composition
 - EUROCHAMP : Study of chemical processes using simulation chambers
 - GEMS : quantification of sources, sinks and intercontinental transport of various gases radiatively or chemically active
 - GEOMON : monitoring air quality and climate
 - MACC : study of change in atmospheric composition and implementation of operational systems for forecasting air quality in the context of GEMS
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Collaborations

LISA is a laboratory both involved in national and international cooperation. In international cooperation, the laboratory is today involved in many European programs and networks of excellence. LISA acts also as PI (Principal Investigator) and Col (Co-investigator) in different cometary or planetary missions supported by CNES and / or the ESA. Finally, many international collaborations have been established through joint projects, international projects of scientific cooperation (PICS with Tunisia and Russia), associated foreign laboratories (LEA) or bilateral agreements. In addition, many members of the laboratory participate very actively in various committees or program of CNRS / INSU and the operation of its two parent universities. Finally, the LISA is also implicated in various programmatic structures of ministries or agencies (MEEDM, Ministry of Research, ADEME, CNES ...).

Tools / experimental developments

- Numerical modeling of these processes and data assimilation (CHIMERE, RAMS),
- Development of experiments and / or models for understanding of fundamental processes
- Spectrophotometry, laser diodes, simulation chambers, microscopes, GCMS,
- Ground observations (infrared measurements, network participation PHOTONS,
- Observations related to instrumentation systems (aircraft, spacecraft).

Management team

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Access to LISA website

