

## A) Research activity

### A1) General description

*describe general mission of the Institute*

Max 500 chars

The Institute aims at an integrated scientific understanding of the atmosphere on all scales by means of a multidisciplinary approach which combines competences in meteorology, climate, atmospheric composition and Earth observations and performs basic research, experimental and modelling work and impact evaluation. ISAC is the largest CNR Institute on atmospheric sciences, structured in 7 Units over the country, 7 permanent observatories, including 2 GAW-WMO Global Stations and 2 Supersites.

*describe existing groups and research lines of the Institute, specifying excellence groups, as well as most productive and / or most promising research lines, taking into account the international context*

Max 4.000 chars

The scientific activity of the Institute is structured in 8 lines of research, all of which share the character of interdisciplinarity stressed in the CNR Strategic Vision Document-2013, and take into account the International Research Agenda and the thematic priorities identified by the CNR-DTA.

The *Climate dynamics and variability: processes, reconstructions, scenarios and impacts* group performs studies of the basic processes of climate dynamics and variability; the impact of climate change on the water cycle; global and regional predictions from seasonal to centennial time scales; downscaling and risk assessment in sensitive areas (mountains, Mediterranean, the Arctic); analysis of climate time-series and products for Climate Services.

The *Atmospheric dynamics and turbulence modelling* group aims at furthering the understanding of atmospheric phenomena by developing numerical tools that simulate and predict, with improved accuracy, the physical and dynamical processes responsible for atmospheric variability from the planetary to the turbulent scale; and addresses society needs by developing applications in the fields of meteorology, atmospheric composition, dispersion, and air quality.

The *Clouds and precipitation physics* group pursues a common physical understanding of cloud dynamical and microphysical processes and precipitation formation; deals with observations from radar, satellite and ground-based systems, and modelling of precipitating systems; studies applications in weather prediction, climate evolution, civil protection and solar and wind energy production.

The *Sources, transformation and deposition of anthropogenic and natural compounds and air quality-climate interactions* group deals with the identification and quantification of anthropogenic and natural sources of atmospheric particulate matter and trace gases; the transport, transformation and deposition of gases and aerosols; the evaluation of local, regional and global budgets of trace constituents of the atmosphere.

The *Physical observations and modelling for a healthy atmosphere* group performs integrated studies of 4D meteorological fields and pollution metrics and evaluates their impact on environment, climate and health, with particular focus on Mediterranean Megacities like Rome, where the group operates within a unique atmospheric supersite.

The *Climate hotspots: technological development and atmospheric observation* group performs observational activities in areas identified as climate 'hot spots', such as Polar regions, Himalayas and Karakorum, the Mediterranean area and the Tropics; it also studies Earth and planetary atmospheres through analysis of data from satellite probes, developing innovative software and technologies. The activities are supported by in-situ infrastructures and mobile systems.

The *Global Ocean Satellite monitoring and marine ecosystem studies* group integrates satellite observations of the ocean with in situ data and numerical marine circulation model output to monitor the ocean essential variables, and assess the physical and biological marine environment in the short and long term. The integrated data system supports the improvement of numerical modelling of the dynamics of physical, chemical and biological Lagrangian tracers and the development of innovative algorithms for data assimilation.

The *Natural, environmental and anthropic hazards of cultural heritage* group is focused on the study of the physical, chemical and biological deterioration mechanisms of natural and anthropogenic origin and the interaction between cultural heritage (movable and immovable) with indoor and outdoor environment. The research activities aim at assessing, predicting and managing natural, environmental and anthropogenic hazards induced by climate, microclimate, pollutants and anthropic influence.

## A2) Attractiveness analysis

describe Institute's activities in terms of performance and attractiveness to young researchers identifying the strongest groups and the most productive and / or most interesting research lines

Max 3.000 chars

Attractiveness to young researchers is provided by the spectrum of advanced and productive research activities in which they are involved. A list follows, organized by research line:

### **Climatology**

Fundamental processes and interactions of the climate system: numerical simulations, past climate reconstruction, hydrological cycle in mountain regions, development of downscaling methods for the generation of high-resolution climate scenarios for impact studies, stratosphere-troposphere interactions, extreme events and dynamics of sea ice.

### **Dynamic Meteorology and Turbulence**

Dynamics of the atmosphere on all scales, from planetary circulation to convective and turbulent processes, in the troposphere and the atmospheric boundary layer, performed with theoretical analysis and original numerical models.

### **Clouds and Precipitation**

Observations and modelling are designed for investigating clouds and precipitation physical processes of Mediterranean/mid-latitude and tropical storms; satellite and ground-based active (Doppler/polarimetric radar) and passive (MW/VIS/IR) sensing; sea breezes, offshore flow fields and moist atmospheric convection modelling; regional climatology of precipitation in drought and flood prone areas.

### **Atmospheric composition change**

Effects of man-made changes in atmospheric composition and impact on climate, ecosystems and human health: changes of sources, transformation and removal processes in natural/background aerosol; interactions between climate change, air quality, and effects on human health; sources and transformation of natural and anthropogenic organic aerosol; impact of maritime transport on pollution in port-cities.

### **Climate Hot-Spot**

Climate change and air quality interactions in Hot-Spot regions; characterization of atmospheric composition in background conditions; radiative and chemical-physical processes in Polar Regions; survey of terrestrial and extra-terrestrial planetary atmospheres through satellite data analysis; technological development of observational systems.

### **Mediterranean Cities and Environment**

Development of innovative hardware and software tools for atmospheric investigation. Lidar, Sodar, in situ and satellite data used in conjunction with numerical models to implement novel metrics for environmental monitoring and improvement.

### **Ocean Satellite**

Satellite monitoring and marine ecosystem study: satellite marine data processing, analysis and climatology studies; in situ and remotely sensed hydrology and biogeochemistry; marine bio-optics; oil spill monitoring; estuarine dynamics and biogeochemistry; operational oceanography.

### **Cultural Heritage**

Cultural heritage conservation: development of non-invasive techniques for monitoring pollution impact; risk assessment due to climate change, including extreme events; assessment of efficiency and durability of new consolidating materials and restoration techniques; integration and application of innovative energy efficient solutions for smart management.

## A3) Attractiveness data

Type	Total n°	of which from other countries
Research grants	78	8
PhD students	40	6
Post doc students	51	9
Marie-Curie Fellowship	2	2
Stage	5	0

## A4) Funding sources - grants

indicate up to 8 most relevant grants awarded to the Institute by filling the following tables  
Time span: 2011-2014

- 1) 

Title	Technologies and tools to prioritize Assessment and diagnosis of air pollution impact on immo	
Acronym	TEACH	Role Coordinator
Funding agency / Institution	EC-DG Research and Innovation_FP7-COOPERATION	
Funding to CNR (€)	372.124	
- 2) 

Title	Nano-systems for the conservation of immoveable and moveable polymaterial Cultural	
Acronym	NANOMATCH	Role Coordinator
Funding agency / Institution	EC-DG Research and Innovation_FP7-COOPERATION	
Funding to CNR (€)	353.285	
- 3) 

Title	Atmospheric Composition Change: the European Network-Policy Support and Science	
Acronym	ACCENT-PLUS	Role Coordinator
Funding agency / Institution	EC-RDG Research and Innovation_FP7-COOPERATION	
Funding to CNR (€)	160.000	
- 4) 

Title	Desert-dust impact on air quality through model-predictions and advanced sensors	
Acronym	DIAPASON	Role Coordinator
Funding agency / Institution	EC - DG Environment- LIFE PLUS	
Funding to CNR (€)	522.087	
- 5) 

Title	Development and pre-operational validation of GMES Marine Core Services and capabilities	
Acronym	MYOCEAN	Role Participant
Funding agency / Institution	EC-DG Research and Innovation_FP7-COOPERATION	
Funding to CNR (€)	856.752	
- 6) 



Title	Prototype Operational Continuity for the GMES Ocean Monitoring and Forecasting Service	
Acronym	MYOCEAN 2	Role Participant
Funding agency / Institution	EC-DG Research and Innovation_FP7-COOPERATION	
Funding to CNR (€)	685.628	

7)	Title	Global Earth Observation for integrated water resource assessment
	Acronym	earth2Observe
	Role	Participant
	Funding agency / Institution	EC-DG Research and Innovation_FP7-COOPERATION
	Funding to CNR (€)	452.623
8)	Title	Stratospheric and upper tropospheric processes for better climate prediction
	Acronym	STRATO CLIM
	Role	Participant
	Funding agency / Institution	EC-DG Research and Innovation_FP7-COOPERATION
	Funding to CNR (€)	427.500

## B) SWOT analysis

*SWOT analysis consisting of a matrix outlining strengths and weaknesses of each Institute under evaluation, a discussion of opportunities from which it could benefit, and a candid statement of existing threats the Institute is facing*

Max 1.000 chars per field

	HELPFUL	HARMFUL
<b>INTERNAL ORIGIN</b>	<ul style="list-style-type: none"> <li>-Contribution to the advancement of knowledge: 2.1 yearly ISI Pub/res.</li> <li>-Capacity of external funding attractiveness with 7 M€ yearly mean</li> <li>-Research lines of long standing including experimental and modelling activities</li> <li>-Multi/interdisciplinary approach in the field of atmospheric sciences</li> <li>-High research qualification recognized by CNR with the appointment of 9 and 3 Research Directors (highest researcher level) out of 21 and 5, in the last two Earth Sciences selections in the 13 DTA Institutes</li> <li>-Top performing groups with recognized international leadership</li> <li>-Diffuse researchers' competence and competitiveness</li> <li>-High-level representation in international bodies and editorial boards</li> <li>-Experience in the coordination of national/international projects</li> <li>-Competence in advising and supporting policy-makers</li> <li>-The 7 ISAC Units and their infrastructures cover the national territory with permanent observatories</li> <li>-Presence in international observatories (Antarctica, </li> </ul>	<ul style="list-style-type: none"> <li>- Average age of researchers (47) higher than the European average</li> <li>- Loss of technical expertise due to decreasing and insufficient number of technicians.</li> <li>- Increase of internal administrative work relative to public tenders, transparency and antifraud procedures with insufficient administrative personnel.</li> <li>- Lack of institutional internal instruments for the valorization and recognition of merit and skills</li> <li>- Insufficient use of public-private partnerships to strengthen technology transfer and business knowledge</li> <li>- Improvement of critical mass of research groups still in progress although fragmentation was reduced and more coordination of research groups was performed in recent years</li> </ul>
<b>EXTERNAL ORIGIN</b>	<ul style="list-style-type: none"> <li>- European and transnational research programmes included themes on which ISAC is competent and competitive: FP7, Horizon 2020, EC Life, Copernicus, JP I, JP EERA, ECRA, ESA, Innovation Plan</li> <li>- National and regional programmes included priorities which allowed ISAC to reinforce relationships with the territory and private enterprises: National Research Plan 2011-2013, Structural National Funding's, Regional Structural Funding's, Regional Environmental Agencies-ARPA (Piemonte, Liguria, Emilia Romagna, Lazio, Puglia, Calabria)</li> <li>- Participation in international organizations for contribution in research planning (C3)</li> <li>- Transfer of research results to International and European Bodies: IPCC, EC, JPI</li> <li>- Expertise for the societal sustainable development as proved by activities addresses to Ministries (D3)</li> <li>- Education and training in atmospheric sciences and climate disciplines: many ISAC Researchers teach University courses and the Institute organizes Advanced Schools.</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of continuity in national research policy.</li> <li>- Lack of clear and transparent rules for researchers career advancements.</li> <li>- Underuse of the evaluation tools in promoting personnel merit and excellence.</li> <li>- Bureaucratic rules for young researcher recruitment, following the procedures of the Public Administration.</li> <li>- Apart from permanent personnel costs, the research activities almost entirely depend on external funding.</li> <li>- Reduced availability of internal CNR funding for internal research infrastructures (laboratories, information technologies-ICT).</li> <li>- Lack of internal CNR funding for supporting external permanent Earth observatories and infrastructures, which are at present managed by external research grants, characterized by fragmentation.</li> <li>- Bureaucratic and time-consuming CNR management procedure.</li> <li>- Insufficient ICT level for Institutes' management.</li> </ul> 

Comments to the SWOT analysis described above (max 1.500 chars)

**STRENGTH**  
ISAC shows good performance when comparing the past CNR 5 years evaluation (2003-2007) with the present one (4 years)  
-Excellent publication increase: Total ISAC ISI Pub from 515 (2003-2007) to 610 (2011-2014). Average yearly ISI pub/researcher from 1.4 to 2.1  
-Yearly average external ISAC funding increased from 3.8 MI€(2003-2007) to 7 MI€ (2011-2014)  
-External ISAC funding per Year :  
2011: 6.1 MI€  
2012: 10.4 MI€  
2013: 4.8 MI€  
2014: 6.8 MI€  
-In A4 only ISAC funding are included. During 2011-2014 period 203 research projects were carried out with a total CNR budget of 39.8 MI€, among international projects, EC projects prevail, with 40 projects, 5 of which coordinated by ISAC  
-Increased productivity with decreased number of personnel and almost same costs: from 76 to 74 researchers, total personnel from 128 to 104 (average two periods) with total average costs 6.0 to 6.8 MI€

**OPPORTUNITIES**  
Intensive training and educational activities, reinforcing collaboration with the University system:  
90 University courses (Bologna, Roma Tor Vergata, Padova, Ferrara, Cagliari);  
119 undergraduate/ graduate thesis;  
26 Schools (i.e. Organizer, Chair, Lecturer)

**WEAKNESS**  
Reduced funding from public administrations (national, regional, local) and enterprises due to economic crisis

**THREATS**  
High cost of permanent ground observatories and field campaigns. High risk of reduced experimental output. Lack of essential data needed for validating models and remote sensing observations

## C) Further information

### C1) Extent of interdisciplinary and innovative contributions to science

518 number of papers coauthored with scientists from different discipline background









### C2) International collaboration

369 number of papers coauthored with scientists from other countries

### C3) Awards and other recognitions

describe up to 10 most relevant recognitions

- | 1) Denomination  | Awarding institution  |
|--|-----------------------|
| 2004- 2014 Highly Cited Researchers <a href="http://highlycited.org">http://highlycited.org</a>  | Thomson Reuters Award |
| Short description (max 250 chars)  |                       |
| M.C. Facchini received Thomson Reuters Award being among the top 1% most cited scientists in Geosciences in the period 2004- 2014 and earning the mark "exceptional impact in the field" |                       |
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- | 2) Denomination  | Awarding institution  |
|--|-----------------------|
| 2004- 2014 Highly Cited Researchers <a href="http://highlycited.org">http://highlycited.org</a>  | Thomson Reuters Award |
| Short description (max 250 chars)  |                       |
| S. Fuzzi received Thomson Reuters Award being among the top 1% most cited scientists in Geosciences in the period 2004- 201 and earning the mark "exceptional impact in the field" |                       |
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- | 3) Denomination  | Awarding institution  |
|--|---|
| Contribution to IPCC Fifth Assessment Report - AR5 <a href="#">(?)</a>   | Intergovernmental Panel on Climate Change <a href="#">+</a> |
| Short description (max 250 chars)  |   |
| IPCC AR5 ISAC contribution: M.C. Facchini: Lead Author Ch. 1, Contributing Author Ch. 7 - WG1; S. Fuzzi: Review Editor and Contributing Author Ch 7 - WG1; S. Corti: Contributing Author Ch 11 - WG 1; C. Sabbioni: Contributing Author Ch 23 - WG2. |   |

- 4) Denomination Awarding institution  
 Member of the Commission for Atmospheric Sciences  World Meteorological Organization (WMO)  
 Short description (max 250 chars)  
 V. Levizzani is Member of the CAS, whose mission is: support research in atmospheric science; reduce and mitigate natural disasters; protect the environment; enhance understanding and response to environmental change.
- 5) Denomination Awarding institution  
 Member of Inter-Commission Coordination Group - Inter  World Meteorological Organization (WMO)  
 Short description (max 250 chars)  
 S. Fuzzi is member of the Member of Inter-Commission Coordination Group - Integrated Global Observing System (WIGOS): coordination and prioritization of WIGOS-related activities carried out by relevant technical commissions for all WMO domain areas.
- 6) Denomination Awarding institution  
 Coordinator of the Geo-Ecosystem Task and Coordinat  Group on Earth Observations (GEO)  
 Short description (max 250 chars)  
 A.Provenzale is Coordinator of the Geo-Ecosystem Task and of GEO-GNOME, providing free and open-access to data and products, build capacity and dissemination on future climate and environmental projections for mountain regions at global scale.
- 7) Denomination Awarding institution  
 Member of the Coordination Structure and of the Exec  Council of EU Member States and Italian   
 Short description (max 250 chars)  
 C. Sabbioni is in the Italian Coordination of the Joint Programming Initiative CH with 18 Countries, which implemented a Common Vision, the Strategic Research Agenda and common research activities, including two transnational calls (2013 and 2014).
- 8) Denomination Awarding institution  
 Member of the EuroGOOS Steering Committee (2008  EuroGOOS AISBL – Consortium  
 Short description (max 250 chars)  
 R. Santoleri is Member of Executive Directors Board of EuroGOOS, which is an International Non-Profit Organisation composed by 37 Members from 18 European Countries providing operational oceanographic services and carrying out marine research.
- 9) Denomination Awarding institution  
 Member of the Sentinel-3 (S3) Validation Team WG op  ESA/EUMETSAT  
 Short description (max 250 chars)  
 R. Santoleri is member of the validation team convened by ESA and EUMETSAT with the aim to engage world-class validation expertise and activities to complement S3 routine validation activities and ensure the best possible outcomes for S3 mission
- 10) Denomination Awarding institution  
 Chairman of Science Application Group (SAG) EPS-S  EUMETSAT  
 Short description (max 250 chars)  
 Within EUMETSAT Polar System-Second Generation (EPS-SG), providing observations for users in 2020, V. Levizzani is Chairman of the SAG of the VIS/IR sensor METImage for his recognised expertise in the atmospheric observations from satellite sensors



## C4) Organisation of international conferences

*describe up to 5 most relevant organisation conferences*

- 1) Denomination

Short description (max 500 chars)

S. Fuzzi was Chair of this International Symposium. The goals of the Symposium was to promote the integration and collaboration of the relevant scientific communities within the subject of atmospheric composition change and to establish a constructive interaction with policy-makers. Ca. 120 delegates, representing research institutions from all over the world attended the Symposium.

- 2) Denomination

Short description (max 500 chars)

M.C. Facchini was Chair of "Theme 15 Atmospheric aerosol in air quality and climate: the science and solutions" of the Goldschmidt Conference 2013. The Theme 15 was organized in 8 different sessions. The Goldschmidt 2013 had a total of 4100 participants.

- 3) Denomination

Short description (max 500 chars)

S. Fuzzi was the Chair of the Symposium ACCENT -Plus aimed at promoting the integration and collaboration of the relevant EC-funded projects in the field of atmospheric composition change. The link with the most important international projects ensured exchange with the international extra-European scientific community. Ca. 100 delegates, representing research institutions from all over the world, attended the Symposium.

- 4) Denomination

Short description (max 500 chars)

S. Corti was co-Director of the workshop organised at the Abdus Salam International Centre for Theoretical Physics (ICTP), which aimed to bring together researchers who apply classification techniques to describe and verify weather forecasts, climate anomalies over a range of time scales and applications of human dimension.

- 5) Denomination

Short description (max 500 chars)

L. Baldini (leader), V. Levizzani and G. Panegrossi organized the workshop at CNR, Rome. The Workshop of the Global Precipitation Measurement (GPM) mission Ground Validation international team was focused on: Developing consensus plans for post-launch assessments of satellite algorithms/products using GV measurements; Reviewing results from physical validation and related field campaigns measurements; Coordination of Integrated Validation Activities. (80 participants)

**C5) Relevant publications (2011-2014)**

*include an attachment with 20 most relevant publications in the time span 2011-14*



**C5) Relevant publications (2011-2014)**

Ranking criteria:

i) Publications 1-10 : Ranking criterion 1: Impact Factor – Ranking criterion 2: number of citations

ii) Publication 11-20 : Ranking criterion 1 : ISAC First Author – Ranking criterion 2: number of citations

	Publication Year	Document Title	Authors	Journal Title	N. Citations (on Feb., 12th 2015)	Impact Factor	Journal Ranking
1	2012	Linking the historic 2011 Mississippi River flood to coastal wetland sedimentation	<b>Falcini F.</b> , Khan N.S., Macelloni L., Horton B.P., Lutken C.B., Mckee K.L., <b>Santoleri R.</b> , <b>Colella S.</b> , Li C., <b>Volpe G.</b> , D'emidio M., Salusti A., Jerolmack D.J.	Nature Geoscience	17	11,6	Q1
2	2014	Decadal climate prediction an update from the trenches	Meehl G.A., Goddard L., Boer G., Burgman R., Branstator G., Cassou C., <b>Corti S.</b> , Danabasoglu G., Doblas-Reyes F., Hawkins E., Karspeck A., Kimoto M., Kumar A., Matei D., Mignot J., Msadek R., Navarra A., Pohlmann H., Rienecker M., Rosati T., Schneider E., Smith D., Sutton R., Teng H., Van Oldenborgh G.J., Vecchi G., Yeager S.	Bulletin of the American Meteorological Society	20	11,5	Q1
3	2014	HyMeX: A 10-Year Multidisciplinary Program on the Mediterranean Water Cycle	P. Drobinski, V. Ducrocq, P. Alpert, E. Anagnostou, K. Béranger, M. Borga, I. Braud, A. Chanzy, <b>S. Davolio</b> , G. Delrieu, C. Estournel, N. Filali Boubrahmi, J. Font, V. Grubišić, S. Gualdi, V. Homar, B. Ivančan-Picek, C. Kottmeier, V. Kotroni, K. Lagouvardos, P. Lionello, M. C. Llasat, W. Ludwig, C. Lutoff, A. Mariotti, E. Richard, R. Romero, R. Rotunno, O. Roussot, I. Ruin, S. Somot, I. Taupier-Letage, J. Tintore, R. Uijlenhoet, H. Wernli	Bulletin of the American Meteorological Society	15	11,5	Q1

4	2013	Precipitation from space: Advancing earth system science	Kucera P.A., Ebert E.E., Turk F.J., <b>Levizzani V.</b> , Kirschbaum D., Tapiador F.J., Loew A., Borsche M.	Bulletin of the American Meteorological Society	13	11,5	Q1
5	2014	Hymex-SOPI the field campaign dedicated to heavy precipitation and flash flooding in the Nord-Western Mediterranean	Véronique Ducrocq, Isabelle Braud, <b>Silvio Davolio</b> , Rossella Ferretti, Cyrille Flamant, Agustin Jansa, Norbert Kalthoff, Evelyne Richard, Isabelle Taupier-Letage, Pierre-Alain Ayral, Sophie Belamari, Alexis Berne, Marco Borga, Brice Boudevillain, Olivier Bock, Jean-Luc Boichard, Marie-Noëlle Bouin, Olivier Bousquet, Christophe Bouvier, Jacopo Chiggiato, Domenico Cimini, Ulrich Corsmeier, Laurent Coppola, Philippe Cocquerez, Eric Defier, Julien Delanoë, Paolo Di Girolamo, Alexis Doerenbecher, Philippe Drobinski, Yann Dufournet, Nadia Fourrié, Jonathan J. Gourley, Laurent Labatut, Dominique Lambert, Jérôme Le Coz, Frank S. Marzano, Gilles Molinié, Andrea Montani, Guillaume Nord, Mathieu Nuret, Karim Ramage, William Rison, Odile Roussot, Frédérique Said, Alfons Schwarzenboeck, Pierre Testor, Joël Van Baelen, Béatrice Vincendon, Montserrat Aran, Jorge Tamayo	Bulletin of the American Meteorological Society	13	11,5	Q1
6	2011	Saharan dust and associations between particulate matter and daily mortality in Rome, Italy	Mallone S., Stafoggia M., Faustini A., <b>Gobbi G.P.</b> , Marconi A., Forastiere F.	Environmental Health Perspectives	55	7,1	Q1
7	2011	Climate warming, ecological mismatch at arrival and population decline in migratory birds	Saino N., Ambrosini R., Rubolini D., <b>Von Hardenberg J.</b> , <b>Provenzale A.</b> , Huppopp K., Huppopp O., Lehikoinen A., Lehikoinen E., Rainio K., Romano M., Sokolov L.	Proceedings of the Royal Society B: Biological Sciences	65	5,4	Q1

8	2011	General overview: European Integrated project on Aerosol Cloud Climate and Air Quality interactions (EUCAARI)-integrating aerosol research from nano to global scales	Kulmala M., Asmi A., Lappalainen H.K., Baltensperger U., Brenguier J.-L., <b>Facchini M.C.</b> , Hansson H.-C., Hov O., O'Dowd C.D., Poschl U., Wiedensohler A., Boers R., Boucher O., De Leeuw G., Denier Van Der Gon H.A.C., Feichter J., Krejci R., Laj P., Lihavainen H., Lohmann U., McFiggans G., Mentel T., Pilinis C., Riipinen I., Schulz M., Stohl A., Swietlicki E., Vignati E., Alves C., Amann M., Ammann M., Arabas S., Artaxo P., Baars H., Beddows D.C.S., Bergstrom R., Beukes J.P., Bilde M., Burkhardt J.F., Canonaco F., Clegg S.L., Coe H., Crumeyrolle S., D'Anna B., <b>Decesari S.</b> , <b>Gilardoni S.</b> , Fischer M., Fjaeraa A.M., Fountoukis C., George C., Gomes L., Halloran P., Hamburger T., Harrison R.M., Herrmann H., Hoffmann T., Hoose C., Hu M., Hyvarinen A., Horrak U., Iinuma Y., Iversen T., Josipovic M., Kanakidou M., Kiendler-Scharr A., Kirkevag A., Kiss G., Klimont Z., Kolmonen P., Komppula M., Kristjansson J.-E., Laakso L., Laaksonen A., Labonnote L., Lanz V.A., Lehtinen K.E.J., Rizzo L.V., Makkonen R., Manninen H.E., McMeeking G., Merikanto J., Minikin A., Mirme S., Morgan W.T., Nemitz E., O'Donnell D., Panwar T.S., Pawlowska H., Petzold A., Pienaar J.J., Pio C., Plass-Duelmer C., Prevot A.S.H., Pryor S., Reddington C.L., Roberts G., Rosenfeld D., Schwarz J., Seland O., Sellegri K., Shen X.J., Shiraiwa M., Siebert H., Sierau B., Simpson D., Sun J.Y., Topping D., Tunved P., Vaattovaara P., Vakkari V., Veefkind J.P., Visschedijk A., Vuollekoski H., Vuolo R., Wehner B., Wildt J., Woodward S., Worsnop D.R., Van Zadelhoff G.-J., Zardini A.A., Zhang K., Van Zyl P.G., Kerminen V.-M., Carslaw K.S., Pandis S.N.	Atmospheric Chemistry and Physics	79	5,3	Q1
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9	2011	Number size distributions and seasonality of submicron particles in Europe 2008-2009	Asmi A., Wiedensohler A., Laj P., Fjaeraa A.-M., Sellegri K., Birmili W., Weingartner E., Baltensperger U., Zdimal V., Zikova N., Putaud J.-P., <b>Marinoni A.</b> , Tunved P., Hansson H.-C., Fiebig M., Kivekas N., Lihavainen H., Asmi E., Ulevicius V., Aalto P.P., Swietlicki E., Kristensson A., Mihalopoulos N., Kalivitis N., Kalapov I., Kiss G., De Leeuw G., Henzing B., Harrison R.M., Beddows D., O'Dowd C., Jennings S.G., Flentje H., Weinhold K., Meinhardt F., Ries L., Kulmala M.	Atmospheric Chemistry and Physics	71	5,3	Q1
10	2011	Air quality trends in Europe over the past decade: A first multi-model assessment	Colette A., Granier C., Hodnebrog O., Jakobs H., <b>Maurizi A.</b> , Nyiri A., Bessagnet B., D'Angiola A., D'Isidoro M., Gauss M., Meleux F., Memmesheimer M., Mieville A., Rouil L., <b>Russo F.</b> , Solberg S., Stordal F., <b>Tampieri F.</b>	Atmospheric Chemistry and Physics	36	5,3	Q1
11	2011	Evidence of a natural marine source of oxalic acid and a possible link to glyoxal	<b>Rinaldi M., Decesari S., Carbone C., Finessi E., Fuzzi S.</b> , Ceburnis D., O'Dowd C.D., Sciare J., Burrows J.P., Vrekoussis M., Ervens B., Tsigaridis K., <b>Facchini M.C.</b>	Journal of Geophysical Research: Atmospheres	23	3,44	Q1
12	2012	Precipitation variability and change in the Calabria region (Italy) from a high resolution daily dataset	<b>Brunetti M.</b> , Caloiero T., Coscarelli R., Gulla G., <b>Nanni T., Simolo C.</b>	International Journal of Climatology	21	3,4	Q1
13	2011	An important fingerprint of wildfires on the European aerosol load	<b>Barnaba F., Angelini F.</b> , Curci G., <b>Gobbi G.P.</b>	Atmospheric Chemistry and Physics	20	5,3	Q1
14	2011	Primary and secondary marine organic aerosols over the North Atlantic Ocean during the MAP experiment	<b>Decesari S., Finessi E., Rinaldi M., Paglione M., Fuzzi S.</b> , Stephanou E.G., Tziaras T., Spyros A., Ceburnis D., O'Dowd C., Dall'Osto M., Harrison R.M., Allan J., Coe H., <b>Facchini M.C.</b>	Journal of Geophysical Research: Atmospheres	20	3,44	Q1
15	2011	The direct influence of ship traffic on atmospheric PM 2.5, PM 10 and PAH in Venice	<b>Contini D.</b> , Gambaro A., <b>Belosi F.</b> , De Pieri S., Cairns W.R.L., <b>Donateo A.</b> , Zanutto E., Citron M.	Journal of Environmental Management	19	3,2	Q1
16	2011	The 183-WSL fast rain rate retrieval algorithm. Part I: Retrieval design.	<b>Laviola S., Levizzani V.</b>	Atmospheric Research	18	2,4	Q2

17	2012	Seasonal to interannual phytoplankton response to physical processes in the Mediterranean Sea from satellite observations	<b>Volpe G., Nardelli B.B.,</b> Cipollini P., <b>Santoleri R.,</b> Robinson I.S.	Remote Sensing of Environment	16	4,7	Q1
18	2012	Reliability of decadal predictions	<b>Corti S.,</b> Weisheimer A., Palmer T.N., Doblas-Reyes F.J., Magnusson L.	Geophysical Research Letters	16	4,4	Q1
19	2011	Evolution of extreme temperatures in a warming climate	<b>Simolo C., Brunetti M., Maugeri M., Nanni T.</b>	Geophysical Research Letters	16	4,4	Q1
20	2012	Analysis of raw soils and their re-suspended PM10 fractions: Characterisation of source profiles and enrichment factors	<b>Cesari D., Contini D.,</b> Genga A., Siciliano M., <b>Elefante C.,</b> Baglivi F., Daniele L.	Applied Geochemistry	16	2	Q2

# CNR evaluation 2014

## Annex to Institutes Report

Institute **SCIENZE DELL' ATMOSFERA E DEL CLIMA**

### D) Transfer and outreach

#### D1) Technology transfer

*briefly describe technology transfer activities*

Max 1.500 chars

ISAC research areas of interest for enterprises are: aerospace, environmental monitoring, renewable energy, innovative technologies for flight safety, computer science, cultural heritage conservation and agriculture.

Major ISAC actions were:

- a) partnership with the *spin-off* R.E.D. created by ISAC in 2007 for the development of meteorological and microclimatic sensors;
- b) participation in the public-private *PROAMBIENTE Consortium*, which operates on technology transfer to SMEs within an agreement with the Emilia-Romagna Region;
- c) technology transfer and strengthening of industrial SMEs in the field of environmental sensors and remote sensing systems within the I-AMICA Project funded by ERDF;
- d) *joint programs with*: CGS in the aerospace field, ARIANET and NESA in the environmental sector;
- e) agreement with French companies (CLS, ACRI-ST) on satellite data exploitation for marine applications.

*Within technological platforms and clusters* ISAC participated in:

- i) the National Aerospace Technology Clusters (Coordinator Thales Alenia Space);
- ii) the NASA GeoStorm mission involving Agenzia Spaziale Italiana-ASI and Thales Alenia Space;
- iii) the Smart Communities Cluster on ICT applications for cultural heritage and tourism;
- iv) the European Construction Technology Platform-ECTP involving over 150 European construction Associations;
- v) the Apulia Region Aerospace District for strengthening the science-technology potential of the Convergence Regions.

#### D2) Professional services

*briefly describe professional services activities*

Max 1.500 chars

- *Impact assessment* of anthropogenic activities *in the long, medium and short term*, aimed at societal sustainability of environmental, industrial, transport, food and energy policies
- *Air quality and human health* aimed at decreasing health care costs through reduced exposure policies
- *High-quality near-real time data delivery* for data assimilation purposes and climate services
- *Numerical weather forecast from nowcasting* to monthly predictions, including extreme weather phenomena, flash floods, hydrogeological events, heat waves and droughts, in support of *accidental hazard response and risk analysis*
- Prediction of meteorological parameters relevant to the production of *renewable energy* (wind, solar)
- Airport take off and landing *safety assessment*: detection, forecast, and control of wind shear
- Radar methodologies for *nowcasting meteo-hydrological risks* and flight safety
- New radar and radiometer *sensors for future satellites*
- New techniques for satellite measurements to *monitor planetary atmospheres*.
- *New integrated products on the state of the marine ecosystem* for the global ocean and for the various sub-basins of the European seas for: marine safety, resource management, coastal monitoring, coastal risk, seasonal and climate forecasts
- Tourism and management of visitor flows for a *sustainable protection of cultural heritage* in urban, rural and coastal areas

### D3) Other outreach activities

*briefly describe other outreach activities*

*(i.e. policy recommendations to government and industry, high-level consulting activities by the unit and/or its researchers individually, public outreach activities,...)*

Max 1.500 chars

ISAC acts as consultant, in support of decision making and referent for technology transfer for the following Ministries:

Council of Ministers-Department of Civil Protection

- Knowledge transfer, development of applications and operational tools for extreme events, acting as Competence Center

Education, University and Research

- *National Programme for Antarctic Research (PNRA), NEXTDATA Project on National data system of environmental and climate data from mountain and marine areas", PON IAMICA -High tech infrastructure for climate-environmental Integrated monitoring", CINECA Referee Committee and Flagship Project RITMARE- Italian Research for the Sea"*

Economy and Finance

- Project SSD PESCA on fishing research and economy for the technological development of Southern Italy

Environment, Land and Sea Protection

- Contribution to the *National Strategy for adapting to climate change for Italy* and to the implementation of the *Marine Strategy Framework Directive*

Ministry Foreign Affairs

- *UN system cooperation for marine science*

Defence - Air Force Meteorological Service

- *EUMETSAT H-SAF Project "Support to Operational Hydrology and Water Management" on precipitation monitoring via satellite data*

Cultural Heritage and Activities and Tourism

- Support to the coordination of *JPI Cultural Heritage and Global Change-JPICH* with 18 Member States and Associated Countries

Support to the Coordination of Research Calls: JPICH Pilot Call 2013, Belmont 2014, JPICH HERITAGE PLUS 2014



## A4) Funding sources - grants (integration to previous module)

for more details, see previous module "scheda\_istituti\_vs4\_distributed"

Time span: 2011-2014

- 1) 

Title	Impact of Biogenic versus Anthropogenic emissions on Clouds and Climate: towards a Holistic		
Acronym	BACCHUS	Role	Participant
Funding agency / Institution	EC-DG Research and Innovation-FP7-COOPERATION		
Funding to CNR (€)	381.383		
  
- 2) 

Title	Infrastruttura di Alta tecnologia per il Monitoraggio Integrato Climatico-Ambientale		
Acronym	I-AMICA	Role	Coordinator
Funding agency / Institution	MIUR - Ministero Istruzione, Università e Ricerca_FESR_PON03		
Funding to CNR (€)	5.795.054		
  
- 3) 

Title	Riduzione dei rischi di volo e nowcasting aeroportuale		
Acronym	RIVONA	Role	Coordinator
Funding agency / Institution	Regione Puglia_POR FESR 2007-2013		
Funding to CNR (€)	2.773.100		
  
- 4) 

Title	Intesa operativa tra la Presidenza dei Ministri, Dipartimento della Protezione Civile ed ISAC		
Acronym	PROTEZIONE CIVILE	Role	Coordinator
Funding agency / Institution	Dipartimento Protezione Civile (DPC)		
Funding to CNR (€)	1.750.000		
  
- 5) 

Title	Sistema nazionale per la raccolta, conservazione, accessibilità e diffusione dei dati ambientali		
Acronym	NEXT-DATA	Role	Participant
Funding agency / Institution	MIUR - CNR-DTA		
Funding to CNR (€)	1.605.650		
  
- 6) 

Title	Progetto pilota inquinamento marino da idrocarburi		
Acronym	PRIMI	Role	Coordinator
Funding agency / Institution	Agenzia Spaziale Italiana (ASI)		
Funding to CNR (€)	787.271		
  
- 7) 

Title	Creazione di TECNOPOLI per la ricerca industriale e il trasferimento tecnologico. Tecnopolo		
Acronym	PROAMBIENTE	Role	Coordinator
Funding agency / Institution	Regione Emilia Romagna_POR FESR 2007-2013		
Funding to CNR (€)	732.628		