ASM2 Project Deliverable Update

Submitting Country/Organization Spain

1. Project Title (150 character limit)

   Atmosphere and Aerosols: More Solid Data for Better Models

2. Funding Program(s) and/or Organization(s)

3. Coordinating organization(s)

4. Name of main contact person

5. Contact email address

6. Summary of Project/Project Goal (300 character limit)

   In June 2017, an instrument with the new technique of solar-sky-moon photometry was installed at the AWIPEV base for monitoring atmospheric aerosols and a training course was held.

7. Description of the project (3000 characters limit)

   Spain is developing a high level research related to the atmosphere in the Arctic area after several decades. The success of this work has been managed by the strong nexus, and therefore, collaboration with other international research institutes. In the case of Spain, the involved institutes have been the Andøya Space Center, the Norwegian Institute for Air Research, and the Finnish Meteorological Institute. There have been other collaborations with several Canadian and American institutions in the framework of the Aerosol Robotic Network (AERONET) of NASA.

   In the next years, the continuation of these previous activities must be performed but also including new challenges with the new man power and instruments that will be provided by Spain. The collaborations with other international institutes will be the base to achieve all the requirements such as the access to the existing infrastructures in Arctic countries. The main aim is the establishment of new long-term data series in those topics. Hence, the photometry using solar and lunar light, which is currently available by means of the new technologies that are being incorporated to investigate even during the polar winters, is able to record data of radiation, aerosols, water vapor and other atmospheric factors. All these well-known techniques must be complemented with other ground-based and

8. Website

9. Duration of Project (YYYY to YYYY)

   to

10. Personnel/Staff Involved
    - 1 - 10
    - 11 - 20
    - 21 - 50
    - More than 50
    - Unknown

11. What is the diversity of project personnel/staff (E.g. gender, career stage, Indigenous representation) (1500 character limit):

12. Stage of Project Development

Proposed
Early Planning
On Going
Final Stages
Finished

13. Next steps for the project if in the proposed, early planning or ongoing stages (1500 character limit):

14. Major progress/developments since ASM2 (1500 character limit):

15. Are there opportunities for new collaborators to join? If so, please describe them. (1500 character limit)

16. Collaborating Countries/Governments *(Choose all that apply)*

- ☐ Austria
- ☐ Belgium
- ■ Canada
- ☐ China
- ☐ Czech Republic
- ☐ Denmark
- ☐ Faroe Islands
- ■ Finland
- ☐ France
- ■ Germany
- ☐ Greenland
- ☐ Iceland
- ☐ India
- ■ Italy
- ☐ Japan
- ☐ Netherlands
- ■ Norway
- ■ Poland
- ☐ Portugal
- ☐ Republic of Korea
- ■ Russia
- ☐ Singapore
- ■ Spain
- ☐ Sweden
- ☐ Switzerland
- ☐ UK
- ■ USA
- ☐ EU
- ☐ Other(s):

17. Location of Project *(Choose all that apply)*

- ☐ Global
- ☐ Polar in General
- ☐ Arctic in General
- ☐ Sub-Arctic in General
- ☐ Alaska in General
- ☐ Alaskan Arctic
- ☐ Canadian Arctic in General
- ☐ Yukon
- ☐ Northwest Territories
- ☐ Nunavut
- ☐ Nunavik
- ☐ Labrador
- ☐ Greenland
- ☐ Iceland in General
- ☐ Icelandic Arctic
- ☐ Faroe Islands
- ☐ Norway in General
- ☐ Norwegian Arctic
- ☐ Svalbard
- ☐ Sweden in General
- ☐ Swedish Arctic
- ☐ Finland in General
- ☐ Finish Arctic
- ☐ Russian Arctic in General
- ☐ Eastern Siberia
- ☐ Western Siberia
- ☐ Arctic Ocean in General
- ☐ Central Arctic Ocean
- ☐ Bering Sea
- ☐ Chukchi Sea
- ☐ Beaufort Sea
- ☐ Hudson Bay
- ☐ Labrador Sea
- ☐ Davis Strait
- ☐ Baffin Bay
- ☐ Denmark Strait
- ☐ Norwegian Sea
- ☐ Greenland Sea
- ☐ Barents Sea
- ☐ Kara Sea
- ☐ Laptev Sea
- ☐ East Siberian Sea
- ☐ Sea of Okhotsk
- ☐ North Pacific Ocean
- ☐ North Atlantic Ocean
- ☐ No Geographic Orientation
- ☐ Other Regions

18. Keywords describing the Deliverable/Project *(Choose all that apply)*

- ☐ adaptation
- ☐ art
- ☐ atmosphere
- ☐ atmospheric sciences
- ☐ biodiversity
- ☐ biology
- ☐ capacity building
- ☐ carbon
- ☐ change
- ☐ climate
- ☐ collaboration
- ☐ communication
- ☐ community
- ☐ community driven
- ☐ coordination
- ☐ cryosphere
- ☐ culture
- ☐ data management
- ☐ disease
- ☐ ecology
- ☐ economic development
- ☐ ecosystems
- ☐ education
- ☐ fisheries
- ☐ food security
- ☐ forecasts
- ☐ freshwater
- ☐ geological sciences
- ☐ geophysics
- ☐ geopolitics
- ☐ glaciers
- ☐ global
- ☐ greenhouse gases
- ☐ history
- ☐ human & health sciences
- ☐ humanities
- ☐ ice sheets
- ☐ Indigenous Knowledge
- ☐ Indigenous Peoples
- ☐ industry
- ☐ infrastructure
- ☐ instrument development
- ☐ knowledge
- ☐ land
- ☐ languages
- ☐ law
- ☐ mapping
- ☐ marine
- ☐ mitigation
- ☐ modelling
- ☐ monitoring
- ☐ observation
- ☐ oceanography
- ☐ outreach
- ☐ permafrost
- ☐ policy
- ☐ pollution
- ☐ prediction
- ☐ remote sensing/GIS
- ☐ resilience
- ☐ resources
- ☐ satellites
- ☐ sea ice
- ☐ snow
- ☐ social sciences
- ☐ society
- ☐ space physics
- ☐ stakeholders
- ☐ standardize
- ☐ subsistence (activities)
- ☐ sustainability
- ☐ technology
- ☐ tourism
- ☐ vulnerability
- ☐ water security
- ☐ weather
- ☐ well-being
- ☐ wildlife
- ☐ Other:

19. Does the project include *(Choose all that apply)*:

- ☐ Natural sciences
- ☐ Social sciences
- ☐ Arts & Humanities
- ☐ Indigenous Knowledge
- ☐ Community-driven research/monitoring
- ☐ Education/Capacity Building
- ☐ Outreach

20. If this Deliverable/Project was submitted for ASM1, which theme does it most closely relate to? *(Choose one)*

- ☐ Identifying Arctic-Science Challenges and Their Regional and Global Implications
- ☐ Strengthening and Integrating Arctic Observations and Data Sharing
- ☐ Applying Expanded Scientific Understanding of the Arctic to Build Regional Resilience and to Shape Global Responses
- ☐ Empowering Citizens through Science Technology, Engineering, and Mathematics (STEM) Education Leveraging Arctic Science
- ☐ Not submitted to ASM1 / Do not know

21. As this Project/Deliverable was submitted as a contribution to support the goals of the ASM2 Joint Statement, which areas does it specifically address? *(Choose up to 3)*

- ☐ Theme 1: Strengthening, Integrating and Sustaining Arctic Observations, Facilitating Access to Arctic Data, and Sharing Arctic Research Infrastructure
  - ☐ Move from design to deployment phase of an integrated Arctic observing system
    - ☐ Sustained Arctic Observing Networks (SAON)
    - ☐ Copernicus
    - ☐ Svalbard Integrated Arctic Earth Observing System (SIOS)
    - ☐ Distributed Biological Observatory (DBO)
    - ☐ Other observing system:
  - ☐ Enhance cooperation among space agencies
  - ☐ Cooperate in facilitating international access to Arctic Research Infrastructure
  - ☐ Make Arctic research and monitoring datasets available, discoverable and relevant for communities
  - ☒ Explore new technologies for unmanned observing systems and remote sensing

- ☐ Theme 2: Understanding Regional and Global Dynamics of Arctic Change
  - ☐ Enhance international cooperation
    - ☐ Year of Polar Prediction (YOPP)
    - ☐ Multidisciplinary Drifting Observatory for the Study of Arctic Change (MOSAiC)
    - ☐ Increase predictive capabilities for Arctic weather and climate
    - ☐ Improve confidence in predications for future Arctic changes
  - ☐ Promote voluntary international cooperation
    - ☐ Predicting sea-ice changes
    - ☐ Understanding the impact of changes on freshwater, terrestrial and marine ecosystems
    - ☐ Assessing the stability of permafrost
    - ☐ Better predicting the dynamics of ice sheets, glaciers and ice caps and their ocean connections
    - ☐ Understanding social and economic drivers of Arctic change

- ☐ Theme 3: Assessing Vulnerability and Building Resilience of Arctic Environments and Societies
  - ☐ Enhance multilateral scientific cooperation between Arctic and non-Arctic States, Indigenous Peoples, local communities, and societal and economic stakeholders
    - ☐ Identifying risks and minimizing the impacts of climate and global changes on the Arctic
    - ☐ Developing adaptation and resilience-building strategies
    - ☐ Developing activities that address the sustainability of new Arctic opportunities
  - ☐ Develop and integrate in the Arctic region services making use of climate information
  - ☐ Develop and disseminate best practices for coping with impacts of Arctic change
  - ☐ Develop research and educational programs to support Indigenous languages, cultural and economic practices, sustainable ways of living, and heritage resource preservation

22. In addition to the specific scientific topics mentioned in the ASM2 Joint Statement (identified in the question above), several additional points were agreed to as important. Does this project relate to any of these points identified in the statement? If so, please check the relevant points and include a summary of what was done in the project to address the point(s) in less than 250 words in the space below:

    - ☐ Striving for diversity - also of gender - and inclusiveness in Arctic science, recognizing that cultivating talent and promoting excellence across the social spectrum will lead to better problem solving and innovative solutions to Arctic scientific challenges
    - ☐ Acknowledging that, where appropriate, research in the Arctic has to be carried out - in compliance with national and sovereignties and jurisdictions - respecting the values, interests, priorities, culture and traditions of Arctic Indigenous Peoples and local communities
    - ☐ Including Indigenous Peoples in the assessment and definition of Arctic research priorities
    - ☐ Involving local communities

    Progress made (1500 character limit):

23. Is this Deliverable/Project also being submitted toward the goals of ASM3? If so, which theme[1] does it most closely relate. *(Choose one)*

    - ☐ Theme 1: Observe
      Observing networks, Data sharing – towards implementation
    - ☐ Theme 2: Understand
      Enhance understanding and prediction capability on Arctic environmental and social systems and its global impact.
    - ☐ Theme 3: Respond
      Sustainable development, Evaluation of vulnerability and resiliency, Application of knowledge
    - ☐ Theme 4: Strengthen
      Capacity building, Education, Networking, Resilience – prepare future generations

24. Was this project/deliverable created specifically for / or as direct result of Arctic Science Ministerial Meetings?
    - ☐ Yes
    - ☐ No

[1] Draft themes as of 10 April. The specific wording of subtitles may change but the overall concepts of Observe, Understand, Respond and Strengthen will remain.