2024 DRAGON SYMPOSIUM

DRAGON 5 FINAL RESULTS REPORTING

24-26 JUNE 2024

SOLID EARTH AND DISASTER REDUCTION

Seed questions: Science & Application
Solid earth and disaster reduction

56796 - INTEGRATION OF MULTI-SOURCE RS DATA TO DETECT AND MONITORING LARGE AND RAPID LANDSLIDES AND USE OF ARTIFICIAL INTELLIGENCE FOR CULTURAL HERITAGE PRESERVATION

59308 - SEISMIC DEFORMATION MONITORING AND ELECTROMAGNETISM ANOMALY DETECTION BY BIG SATELLITE DATA ANALYTICS WITH PARALLEL COMPUTING (SMEAC)

59339 - EO FOR SEISMIC HAZARD ASSESSMENT AND LANDSLIDE EARLY WARNING SYSTEM

58029 - COLLABORATIVE MONITORING OF DIFFERENT HAZARDS AND ENVIRONMENTAL IMPACT DUE TO HEAVY INDUSTRIAL ACTIVITY AND NATURAL PHENOMENA WITH MULTI-SOURCE RS DATA

58113 - SARCHAEOLOGY: EXPLOITING SATELLITE SAR FOR ARCHAEOLOGICAL PROSPECTION AND HERITAGE SITE PROTECTION

TUESDAY, 25 JUNE 2024

ID. 56796

INTEGRATION OF MULTI-SOURCE REMOTE SENSING DATA TO DETECT AND MONITORING LARGE AND RAPID LANDSLIDES AND USE OF ARTIFICIAL INTELLIGENCE FOR CULTURAL HERITAGE PRESERVATION

PRINCIPAL INVESTIGATORS:

EUROPEAN LI: **JOAQUIM J. SOUSA**

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HONGLEI YANG, SHIYONG YAN, PENGFEI TU, LUÍS REIS

YOUNG SCIENTISTS: QUN WANG, JIAHUI LIN, YOUFENG LIU, CHI DU, WENJING WEI, XIN WANG, DIOGO COUTO, BRUNO SILVA, VANESSA RITTLINGER

<Wednesday, 26 June, 2024 in IN SOLID EARTH>

ID. 59308

PROJECT TITLE: SEISMIC DEFORMATION MONITORING AND ELECTROMAGNETISM ANOMALY DETECTION BY BIG SATELLITE DATA ANALYTICS WITH PARALLEL COMPUTING (SMEAC)

PRINCIPAL INVESTIGATORS: [YAXIN BI AND JIANBO SU]

CO-AUTHORS: [MAJA PAVLOVIC, CHRISTOPHER O'NEILL, MINGJUN HUANG, WEI ZHAI, XUEMIN ZHANG, JIANPING HUANG]

PRESENTED BY: [PROF JIANBO SUN, PROF YAXIN BI]

WEDNESDAY, 23/JUN/2024

ID. 59339

PROJECT TITLE: EARTH OBSERVATION FOR SEISMIC HAZARD ASSESSMENT AND LANDSLIDE EARLY WARNING SYSTEM

PRINCIPAL INVESTIGATORS: ROBERTO TOMÁS (ROBERTO.TOMAS@UA.ES) & QIMING ZENG (QMZENG@PKU.EDU.CN)

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PRESENTED BY: ROBERTO TOMÁS

WEDNESDAY 25 JUNE 2023 11:00

ID. 58029

PROJECT TITLE:
COLLABORATIVE MONITORING OF DIFFERENT HAZARDS AND ENVIRONMENTAL IMPACT DUE TO HEAVY INDUSTRIAL ACTIVITY AND NATURAL PHENOMENA WITH MULTI-SOURCE REMOTE SENSING DATA

PRINCIPAL INVESTIGATORS: CRISTIANO TOLOMEI & LIANHUAN WEI

CO-AUTHORS:
ELISA TRASATTI, GUIDO VENTURA, CHRISTIAN BIGNAMI, STEFANO SALVI, GUOMING LIU, SHANJUN LIU, YACHUN MAO, MENG AO, ZHITAO XU

PRESENTED BY:
CRISTIANO TOLOMEI

Dragon 5 Final Results Reporting

Wed **26/06/2024**, h 11:45-12:30

ID. 58113

PROJECT TITLE: SARchaeology: exploiting satellite SAR for archaeological prospection and heritage site protection

PRINCIPAL INVESTIGATORS: Dr. Francesca Cigna [PI Europe], National Research Council (CNR) - ISAC
Prof. Timo Balz [PI China], LIESMARS, Wuhan University

CO-I$_S$: Dr. Deodato Tapete [Co-PI], Italian Space Agency (ASI)
Dr. Gino Caspari [Co-PI], Dept. Archaeology, University of Sydney
Prof. Bihong Fu [Co-PI], Aerospace Information Research Institute, Chinese Academy of Sciences (AIR-CAS)

YS$_S$: Mr. Haonan Jiang [YS China], LIESMARS, Wuhan University
Mr. Cem S. Boyoğlu [YS China], LIESMARS, Wuhan University
Mr. Chike Ifeanyi [YS China], LIESMARS, Wuhan University
Ms. Sadia Sadiq [YS China], LIESMARS, Wuhan University
Mr. Michele Abballe [YS Europe], National Research Council (CNR) - ISAC
Ms. Eleonora Azzarone [YS Europe], Italian Space Agency (ASI)

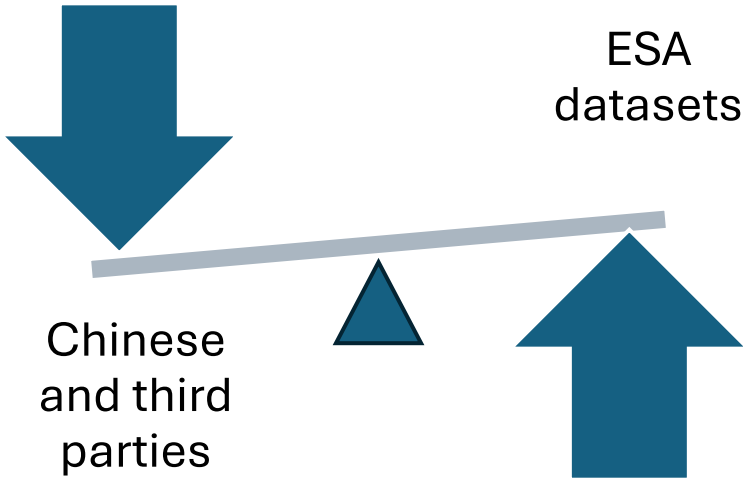
PRESENTED BY: Dr. Francesca Cigna [PI Europe]

Seed questions: Science & Application
Solid earth and disaster reduction

WHAT ARE THE REMAINING ISSUES CONCERNING THE EXPLOITATION OF CURRENT MISSION DATA?

- Third party missions data availability:
- Difficulties to get Chinese EO data (the use of Chinese-European data are unbalanced)

- To facilitate the availability of data from other sensors for cross-validation: it will make Dragon 6 more attractive for researchers
- To state direct cooperations between DRAGON and third parties to facilitate the availability of data (JAXA, Lutan-1, etc.)
- Open catalogue (similar to ESA hub) – Chinese missions
- Organize training sessions for young scientists to browse catalogue
- Include MSS-1, L-SAR01A/B, Hongtu-1 Piesat, and SAOCOM
- increase image quotas (e.g. TSX and CSK)



Seed questions: Science & Application
Solid earth and disaster reduction

WHAT ARE THE NEW SCIENCE FINDINGS IN THE DOMAIN?

- Use AI to:
  - discover useful information from satellite data
  - predict the occurrence and impact of disasters
  - integrate information from different sensors (e.g., Optical and SAR sensors)
  - Synthetic data generation (data gap filling purposes)
- Improvement of the geophysical and geological interpretation of the phenomena (modelling)
- Enhanced algorithms for faster and more accurate processing of large volumes of satellite data
- Exploitation of HPC and cloud computing infrastructures and parallelized processing chains (e.g. GEP)

Seed questions: Science & Application
Solid earth and disaster reduction

EO DATA SYNERGY: IS THERE SCOPE FOR DATA SYNERGY AND IF SO WHICH EO MISSIONS/SENSORS ARE REQUIRED?

- Very few synergies between Chinese and European missions
- Synergies can be found for:
    - Cross validation & cross calibration
    - Data fusion to improve performance
    - Complementarity for spatial, temporal and spectral dimensions & geophysical parameters
    - Analyse different phenomena at different spatial wavelength and scale

Seed questions: Science & Application
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VALIDATION : HAVE THE NECESSARY VALIDATION DATA BEEN COLLECTED AND SHARED?

- In general, in situ data for validation are very difficult to be got or there not exist
- Some countries are providing open access datasets for potential validation
- Field campaigns are time consuming and expensive, but necessary
- Cross validation between different sensors is an alternative
- Share and exchange data within the scientific community to enhance the validation process can improve this task
- Deploy automated sensors and IoT (internet of things) devices to continuously collect validation data can also contribute to this task.
- Think to one (or a few) “supersites” to share data among the SOLID EARTH sub-projects (e.g. Turkey Feb. 2023 earthquake)

Seed questions: Science & Application
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WHAT ARE THE NEW DOMAINS WHERE FURTHER RESEARCH IS NEEDED?

- Promote open source benchmark data produced by partner during the project
- Investigate application of Larger Language Model for geophysical parameters retrieval
- Digital Twin to simulate Solid Earth phenomena and geological processes
- Risk Scenarios towards cost estimation and early warning systems

Seed questions: Science & Application
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HOW CAN WE FILL THE GAP BETWEEN EO EXPERTS, GEO-SCIENTISTS/ENGINEERS AND FINAL USERS IN THE FIELD OF DISASTERS?

- By means of multidisciplinary teams
- By means of validation tests to demonstrate the capabilities of eo techniques to stakeholders
- By developing some user-friendly interfaces (e.g., EGMS)
- By organizing specific dissemination workshops for stakeholders
- By showcasing successful study cases