



ESA-MOST Dragon Cooperation

中国科技部-欧洲空间局“龙计划”合作

2017 DRAGON 4 SYMPOSIUM

2017年“龙计划”四期学术研讨会

26-30 June 2017 | Copenhagen, Denmark

2017年6月26-30日, 丹麦 哥本哈根

FRI. 30 JUNE 2017

DRAGON 4 ID. 32292 PROJECT

SUMMARY

Lead Investigators:

Meng Junmin, First Institute of Oceanography, China

Bernat Martinez, IsardSAT, Spain

Principal Investigators:

Yang Jungang, First Institute of Oceanography, China

Dr. Wolfgang Dierking — Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany.

Dr. Xi Zhang — First Institute of Oceanography, China

Dr. Jacqueline Boutin — LOCEAN, Sorbone Universités, France.

Dr. Jin Wang — Qingdao University

Sub-projects and themes:

Id. 32292_1

Techniques for **sea ice** parameter extraction and sea ice monitoring using new satellite data

Id. 32292_2

Data validation and oceanic applications (SSH, SWH, currents, mesoscale eddies) of new **satellite altimeters** and SWIM

Id. 32292_3

Sea surface salinity algorithm based on combined active/passive microwave imagers

Summary EO data exploitation – cumulative stats all subprojects

ESA & ESA TPM DATA

CRYOSAT-2

SMOS

JASON-2

JASON-3

SENTINELS 1, 2 & 3 DATA

Sentinel 1-A/B SAR

Sentinel 3-A SRAL

CHINESE EO DATA

HJ-1B

GF-1

GF-2

HY-2A

CFOSAT

Results summary id. 32292_1

1. Techniques for sea ice parameter extraction and sea ice monitoring using new satellite data

- ① Bohai sea ice thickness and concentration retrieval by active/passive data
- ② Arctic sea ice types and freeboard detection by Cryosat-2 data
- ③ Sea ice surface topography retrieval by InSAR
- ④ Sea ice types classification by multi-frequency SAR
- ⑤ Improvement of algorithms for detecting ice drifting and deformation

Results summary id. 32292_2

2. Data validation and oceanic applications of new satellite altimeters

- ① New Altimeter waveform retracker for coastal zones
- ② Data comparison between Sentinel-3 SRAL and Jason-2/3 altimeter
- ③ Data comparison between geodesic HY-2A altimeter and Jason-2/3 altimeter
- ④ New fully focused SAR algorithm

Results summary id. 32292_3

3. Sea surface salinity algorithm based on combined active/passive microwave imagers

- ① Retrieval of rain from SMOS satellite salinity in tropical
- ② Correction and application of SMOS product near land
- ③ Sea surface salinity retrieval under rain based on CAP observations

Young scientists contributions

Chinese YS

Zhang Xudong (PhD . candidate)

Internal wave detection by altimeters

Wei Cui (PhD . candidate)

Mesoscale eddy detection by altimeters

European YS

Eduard Makhoul

Coastal Altimetry with Fully Focused SAR over Chinese seas

Academic exchanges & cooperation

- The 3rd Chinese-Finnish Workshop on Sea Ice and Polar Meteorology was held 5-7 June 2017 in Helsinki. 16 Participants from China attended the seminar.
- AWI and FMI collaborate with FIO on improving retracking procedure for ice freeboard retrieval.
- FMI and NSOAS completed sea ice thickness and concentration retrieval in the Bohai Sea.
- AWI and FIO will collaborate on improving algorithms for detecting ice deformation and studying on the use of interferometric SAR for retrieval of ice surface topography.
- LOCEAN and NSSC collaborate on direct L-band model for SSS retrieval

Joint publications

- Dierking, W., Lang, O., Busche, T. (2017), "Sea ice local surface topography from single-pass interferometric InSAR measurements: a feasibility study", The Cryosphere Discuss.
- Zeng T., L. Shi, M. Mäkynen, B. Cheng, J. Zou, and Z. Zhang, "Sea ice thickness analyses for the Bohai Sea using MODIS thermal infrared imagery", Acta Oceanol. Sin., vol. 35, no. 7, pp. 96-104, 2016.
- Karvonen J, Shi L, Cheng B, Similä M, Mäkynen M, Vihma T. Bohai Sea Ice Parameter Estimation Based on Thermodynamic Ice Model and Earth Observation Data. Remote Sensing. 2017; 9(3):234.
- Yin, X., J. Boutin, E. Dinnat, Q. Song, and A. Martin, 2016, Roughness and foam signature on SMOS-MIRAS brightness temperatures: A semi-theoretical approach, Remote Sensing of Environment, doi:<http://dx.doi.org/10.1016/j.rse.2016.02.005>.
- Boutin, J., et al. , Satellite and In Situ Salinity: Understanding Near-surface Stratification and Sub-footprint Variability, 2016, Bulletin of American Meteorological Society, 97(10), doi: 10.1175/BAMS-D-15-00032.1.
- Wang J., et al., Sea Surface Salinity Retrieval under Rain based on Aquarius Combined Active/Passive Observations, IEEE JATSRs, in revision, 2017.

Plans for the next 2 years

Sea-ice

- FMI participates in the Arctic cruises CHINARE-2017 and CHINARE-2018 by proving 4+8 snow and ice mass buoys.
- Joint effort to extend/test algorithms for sea ice drift and deformation retrieval, focusing on different satellite missions (Chinese GF-series, Sentinels), in the Bohai Sea and in the Arctic Ocean.
- Simultaneous use Chinese scatterometer HY2 and radiometer data will be used to monitor sea ice concentration in three fixed domains along the NE Passage.

Altimetry

- Validation of S3 SAR mode data retracers over coastal areas
- Analysis and application of geophysical corrections (dry troposphere, wet troposphere and ionosphere) over coastal areas
- Mesoscale eddy detection by Sentinel-3 and HY-2A altimeter.

Salinity

- Correction for SMOS systematic errors and development of new SMOS CATDS product
- Continuation of sea surface salinity measuring. Extend the algorithms to other satellite (such as SMAP)
- Retrieval algorithm for rain rate and wind speed by L-band microwave imagers