APOLO 2019

Scientific program

Université de Lille · cnrs · EUMETSAT · Chinese Academy of Sciences · GRASP · NASA · cnes · Labex CaPPA

Mon, November 4

8:30– 9:50 Registration
9:50 – 10:00 Welcome, Oleg Dubovik, LOA, France
10:00 – 10:20 Derivation of aerosol properties from polarized observations (INVITED)
Didier Tanré, LOA, France
10:20–10:40 Customer perspectives on polarimetry for aerosol and cloud applications, and what we can do to improve usage (INVITED)
Jeffrey Reid, NRL, USA

Coffee Break 10:40– 11:10

Polarimetric missions and instruments – 1
Chairs: B. Bojkov and D. Tanré
11:10 – 11:30 Origin, programmatic approach and progress in the preformulation study for NASA's Aerosol, Cloud, Convection and Precipitation (ACCP) Observing System (INVITED)
Hal Maring, NASA HQ, USA
11:30 – 11:50 An overview of NASA's aerosols and clouds-convection-precipitation study (INVITED)
Arlindo da Silva, NASA GSFC, USA
11:50 – 12:10 EUMETSAT aerosol missions and products: focus on 3MI, the multi-view polarimeter flying on Metop-SGA (INVITED)
Thierry Marbach, EUMETSAT, Germany
12:10 – 12:30 Cloud detection and characterization based on spectro-polarimetry - operational implementation for EPS-SG/3MI (INVITED)
Bertrand Fougnie, EUMETSAT, Germany

Lunch 12:30 – 14:00

Polarimetric missions and instruments – 2
Chairs: P. Yang and A. da Silva
14:00 – 14:20 High spectral resolution lidar for aerosol characterization and combined lidar + polarimeter retrieval (INVITED)
Sharon Burton, NASA LRC, USA
14:20 – 14:40 The Multi-Angle Imager for Aerosols (MAIA) investigation: application of spaceborne spectropolarimetry to speciated airborne particulate matter exposure and human health (INVITED)
David J. Diner, NASA JPL, USA
14:40 – 14:55 Validation and performance assessment of the Chinese First Multi-angle Polarimetric Satellite Sensor DPC/GF-5
Zhengqiang Li, IRSDE/CAS, China
14:55 – 15:10 The future European CO2 monitoring mission and the need for a multi-angle polarimeter to characterize the atmospheric light path
Jochen Landgraf, KNMI, The Netherlands
15:10– 15:25 The DMSAT-1 mission: primary instrument - polarimeter characteristics and its Earth observation applications
Alya A. AlMaazmi, MBRSC, UAE
15:25– 15:40, MERSI onboard Chinese Fengyun-3: quantitative ability for aerosol retrieval
Leiku Yang, Henan Polytech Univ, China

Coffee Break 15:40 – 16:00

Validation, analysis and field campaigns - 3
Chairs: H. Maring and Jun Wang
16:00 – 16:20 Polarimetric calibration of the spaceborne directional polarimetric camera installed on the GF5 satellite (INVITED)
Yinlin Yuan, CAS, China
16:20 – 16:45 Long-term validation of satellite-derived AOD and the contribution of meteorological factors to its inter-decadal changes
Huizheng Che, CMA, China
16:45– 17:00 ACTRIS/AERONET Europe 2011-2019, eight years supporting science and innovation
Philippe Goloub, University of Lille, France
17:00– 17:15 Optimization of polarization measurements for AERONET aerosol retrievals
Aleksander Sinyuk, NASA GSFC, USA
17:15 – 17:30 ORACLES field campaign observations of clouds and aerosols above cloud by the Research Scanning Polarimeter
Kirk D. Knobelspiesse, NASA GSFC, USA
17:30 – 17:45 Dust aerosol properties and radiative impacts at a suburban site on the North China Plain during 2004-2017
Hongbin Chen, CAS, China
17:45 – 18:00 Aerosol and cloud properties through 3MI airborne simulator measurements: AEROCLO-sA field campaign in the Namibian region
Aurélien Chauvigné, Lille Univ, France

19:00 – 22:00 Ice-breaker

Tue, November 5

Advanced algorithms and data processing – 1
Chairs: A. Da Silva and T. Marbach
9:00 – 9:20 A numerical testbed (UNL-VRTM) for remote sensing of aerosols: new capabilities for non-spherical particles and illumination sources at night (INVITED)
Jun Wang, Univ of Iowa, USA
9:20 – 9:40 A correlation-based inversion approach for aerosol remote sensing (INVITED)
Feng Xu, Univ of Oklahoma, USA
9:40 – 10:00 The Dark Target retrieval algorithm applied to a constellation of imagers: towards an integrated view of global aerosol (INVITED)
Robert C. Levy, NASA GSFC, USA
10:00 – 10:15 GRASP versatile algorithm: utilization in polarimetric remote sensing applications
Oleg Dubovik, Lille Univ, France
10:15– 10:30 The RSP-MAPP algorithm
Snorre Stamnes, NASA LaRC, USA

Coffee Break 10:30 – 11:00

11.00 – 11:15 Retrieval of aerosol properties above clouds from satellites: an overview
Fabien Waquet, Lille Univ, France
11.15 – 11:30 An exploration of joint LIDAR and multiangle polarimeter aerosol retrieval capabilities using the GRASP algorithm and OSSE data derived from the GEOS model
W. Reed Espinosa, NASA GSFC, USA

Polarimetric missions and instruments – 3
Chairs: Zhengqiang Li and David J. Diner
11:30 – 11:50 The Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) Mission and its polarimeters: an overview (INVITED)
Brian Cairns, NASA GISS, USA
11:50 – 12:10 The HARP family of hyper-angular imaging polarimeters and its applications from aircraft and space (INVITED)
J. Vanderlei Martins, UMBC, USA
12:10 – 12:30 The SPEXone polarimeter for the NASA PACE mission (INVITED)
Otto Hasekamp, SRON, The Netherlands

Lunch 12:30 – 14:00

Light scattering by particles and radiative transfer
Chairs: Yongxiang Hu and Itaru Sano
14:00 – 14:20 Advances in single- and multiple-scattering simulation capabilities in support of polarimetric remote sensing of the atmosphere and oceans (INVITED)
Ping Yang TAMU, USA
14:20 – 14:40 Polarized optical properties of dust aerosols: lessons learned from modeling simulations and the Amsterdam-Granada laboratory measurements (INVITED)
Lei Bi, Zhejiang Univ, China
14:40 – 14:55 Implications of orbital multi-angle photopolarimetric observations in the 1.378-μm spectral channel to retrieve microphysical properties and composition of stratospheric aerosols of natural or artificial origin
Zhanna Dlugach, MAO NASU, Ukraine
14:55 – 15:10 Polarimetic exploration of the solar corona during total solar eclipses
Padma A. Yanamandra-Fisher, SSI, USA
15:10 – 15:25 Progress in forward-inverse modeling based on vector radiative transfer models for coupled atmosphere-surface systems and machine learning tools
Knut Stamnes, Stevens Inst, USA
15:25 – 15:40 Improved fast vector radiative transfer solution using small-angle approximation
Bingqiang Sun, Fudan Univ, China

Coffee Break 15:40– 16:00

16:00 – 18:00 Poster session – 1

Section 1 : Polarimetric missions and instruments
Chairs: P. Litvinov and Gennadi Milinevsky

Section 2: Validation, analysis, and field campaigns
Chairs: B. Holben and P. Goloub

Section 3: Light scattering by particles and radiative transfer
Chairs: Zh. Dlugach and L. Bi

Section 4 : Calibration and uncertainties
Chairs: Thomas Ruhtz and Brian Cairns

Wed, November 6

Polarimetric missions and instruments – 4
Chairs: Jeffrey Reid and B. Fougnie
9:00 – 9:20 Detection of dense biomass burning area and the particle properties from GCOM-C/SGLI measurements (INVITED)
Itaru Sano, Sonoyo Mukai, KINDAI Univ Japan
9:20 – 9:40 Aerosol-UA satellite mission for polarimetric study of aerosols in the atmosphere: current status and prospects (INVITED)
Gennadi Milinevsky, Kiev Univ, Ukraine

Advanced algorithms and data processing – 2
Chairs: Sharon Burton and Jochen Landgraf
9:40– 9:55 Aerosol optical depth retrieval over eastern China using the data of the Directional Polarimetric Camera
Rufang Ti, CAS, China
9:55– 10:10 The GRASP cloud - application and demonstration
Michael Aspetsberger, Catalysts GmbH, Austria
10:10– 10:25 Size matters: be wary of characterizing aerosol composition and type with pseudo-intrinsic parameters
Gregory L. Schuster, NASA LaRC, USA

Coffee Break 10:25 – 11:00

11:00– 11:15 Retrieval of aerosol properties from Airborne Hyper-Angular Rainbow Polarimeter (AirHARP) observations during the 2017 ACEPOL campaign
Anin Puthukkudy, UMBC, USA
11:15– 11:30 Aerosol retrievals from the ACEPOL campaign
Guangliang Fu, SRON, The Netherlands

Advanced algorithms and data processing – 3
Chairs: F. Xu and O. Hasekamp
11:30 – 11:45 Uncertainty quantification applied to aerosol retrievals from simulated surface sun photometer and polarimetric satellite observations using GRASP
Michael J. Garay, NASA JPL, USA
11:45 – 12:00 Characterization of aerosol mixture components on the basis of multiwavelength lidar measurements
Igor Veselovskii, General Physics Inst, Russia
12:00 – 12:15 Spaceborne polarimetry of atmosphere-ocean systems in the UV-A part of the spectrum
Jacek Chowdhary, NASA GISS, USA
12:15 – 12:30 Development of active learning and NNN for new remote sensing technique
Hideaki Takenaka, JAXA, Japan

Lunch 12:30 – 14:00

15:00 – 17:00 Social events:

1) 15:00 – 17:00 Walking Lille city tour (meeting point: Office de tourisme, Place Rihour)

2) 15:30 – 17:00 Beaux-Arts Museum, Exposition “Les Plans-Reliefs” (meeting point: Beaux-Arts Museum, Place de la Republique)

3) Conference dinner
19:00 Departure by buses - from Place Rihour, Lille city center
- from Stade Pierre Mauroy, Villeneuve d’Ascq (in front of the hotel Park Inn)

Thu, November 7

Advanced atmospheric products from polarization - 5

Chairs: V. Martins and B. Fougnie

9:30 – 9:50 A study of amorphous aerosol and ice particles in the Earth's atmosphere with polarization measurements (INVITED)
Yongxiang Hu, NASA LaRC, USA

9:50 – 10:05 Multiangle, polarimetric characterization of dust and smoke particles with the AirMSPI instrument on the NASA ER-2 aircraft
Olga V. Kalashnikova, NASA JPL, USA

10:05 – 10:20 Global statistics of cloud top ice microphysical and optical properties
Bastiaan van Diedenhoven, Columbia Univ. and NASA/GISS, USA

10:20 – 10:35 Surface polarized reflectance analysis using space lidar
Sergey Korkin, NASA GSFC, USA

Coffee Break 10:35 – 11:00

11:00 – 11:15 Extended surface/atmosphere characterization using GRASP: new possibilities of classification and global aerosol sources identification
Pavel Litvinov, GRASP SAS, France

11:15 – 11:30 Remote sensing of planetary atmospheric particulate with polarized inelastic scattering
Luca Lelli, Bremen Univ, Germany

Calibration and uncertainties - 6

Chairs: Brian Cairns and Huizheng Che

11:30 – 11:50 AERONET's Evolution: From Hatchlings to DRAGONs (INVITED)
Brent Holben, NASA GSFC, USA

11:50 – 12:05 Calibration of a multispectral polarimeter and calculation of the complete Stokes vector from radiance measurements in the Arctic
Lena Jänicke, Berlin Univ, Germany

12:05 – 12:20 Dynamic transmission and its composition of pollution air mass based on DPC data monitoring
Qunying Zhang, Anhui Univ, China

12:20 – 12:35 Uncertainties of 3MI's polarimetric measurements over inhomogeneous cloud scenes
Souichiro Hioki, Lille Univ, France

Lunch 12:35 – 14:00

14:00 – 15:40 Poster session – 2

Section 5: Advanced algorithms and data processing

Chairs: O. Dubovik and F. Waquet

Section 6 : Advanced atmospheric products from polarization

Chairs: J. Wang and R. Levy

Section 7 : Clouds, ocean color, and atmospheric correction

Chairs: R. Frouin and X. Hu

Coffee Break 15:40 – 16:00

Clouds, ocean color, and atmospheric correction - 7

Chairs: R. Levy and Gennadi Milinevsky

16:00 – 16:15 Ocean-color remote sensing using non-polarized component of top-of-atmosphere reflectance
Robert Frouin, SIO/UCSD, USA

16:15 – 16:30 Modeling polarization of light from heavy aerosols over oceans
Wenbo Sun, NASA LaRC, USA

16:30 – 16:45 Multispectral hyperangular polarimetric observations for ocean color retrievals
Ahmed El-Habashia, NRL, USA

16:45 – 17:00 Neural network-based cloud property retrievals from satellite multi-angle polarimetry
Antonio Di Noia, Univ of Leicester, UK

17:00 – 17:15 Vertical profiles of droplet size distributions derived from cloud-side observations by the Research Scanning Polarimeter: tests on simulated data
Mikhail D. Alexandrov, NASA GISS, USA

17:15 – 17:30 Spatial scales of 3-D cloud radiative smoothing: what the spatial variability of multi-angular and multi-spectral features can reveal about multiple scattering in cloudy atmospheres
Daniel Miller, NASA GSFC, USA

17:30 – 17:45 Cloud products from the Directional Polarimetric Camera: algorithms, results and evaluation
Jinji Ma, Anhui Normal Univ, China

17:45 – 18:00 The impact of liquid cloud vertical profile and cloud top entrainement on droplet size retrieval from 3MI
Huazhe Shang, Lille Univ, France

Presentation of APOLO 2021 and Closing

18:20 Social event

Posters

Section 1: Polarimetric missions and instruments

1. Himadri Sekhar Das, Ayesha Maryam Mazarbhuiya, and Biman Jyoti Medhi, Imaging polarimetry of comets 32P/Comas Sola and C/2015 V2 (Johnson)

2. Qiang Hu, Zhenwei Qiu, Jin Hong, and Dihu Chen, A Polarized Scanning Nephelometer for measurement of ensemble-averaged scattering matrix of aerosol particles: design and validation

3. Zhenyang Li, Peng Zou, Shuangshuang Zhu, Xuefeng Lei, Zhenhai Liu, and Jin Hong, Design and implementation of Airborne Polarization Crossfire System

Section 2: Validation, analysis, and field campaigns

4. Xuehua Fan, Xiangao Xia, and Hongbin Chen, Intercomparison of multiple satellite aerosol products against AERONET over the North China Plain

5. Qiaoyun Hu, Philippe Goloub, Igor Veselovskii, Thierry Podvin, Michael Korenskiy, Zhengqiang Li, and Kaitao Li, The characterization of Asian dust by multi-wavelength lidar measurements in Kashi

6. Chong Li and Jing Li, Uncertainty analysis of satellite aerosol products

7. Kaitao Li, Zhengqiang Li, Donghui Li, Hua Xu, and Yisong Xie, Comparison of aerosol characteristics derived from SONET and AERONET version-2 and -3

Section 3: Light scattering by particles and radiative transfer

8. Jessica A. Arnold, Gorden Videen, E. Zubko, and Alycia J. Weinberger, The effect of internal structure on the scattering properties of agglomerated debris particles

9. Zhanna M. Dlugach and Michael I. Mishchenko, Multiple scattering of polarized light by particles in an absorbing medium

10. Or Elezra and Yoav Y. Schechner, Stochastic polarized scattering tomography for the retrieval of scatteres in the atmosphere

11. M. Hornung, A. Jain, M. Frenz, and H. G. Akarçay, Interpreting and modeling backscattering polarimetric patterns recorded from multiply scattering systems

12. Alexander V. Konoshonkin, Natalia V. Kustova, Anatoli G. Borovoi, Dmitry N. Timofeev, Victor A. Shishko, Alexandra Tsekeri, and Josef Gasteiger, The physical optics method for light scattering on large nonspherical atmospheric particles

13. Natalia V. Kustova, Anatoli G. Borovoi, Alexander V. Konoshonkin, Victor A. Shishko, and Dmitry N. Timofeev, Coherent and incoherent light scattering near the backward direction for an irregular shape particles of cirrus clouds

14. Patricio G. Piedra, Christian Golbert, Yongle Pan, Aimable Kalume, and Gorden Videen, Understanding light-scattering particle discrimination through the eyes of machine learning

15. Alexandra Tsekeri, Josef Gasteiger, Alexander Konoshonkin, Natalia Kustova, Thanasis Georgiou, and Vassilis Amiridis, Scattering database of oriented dust particles with realistic shapes and sizes

Section 4 : Calibration and uncertainties

16. Milagros E. Herrera, Oleg Dubovik, Tatyana Lapyonok, Anton Lopatin, Benjamin Torres, Juan L. Bali, and Pablo R. Ristori, Evaluation of error estimates of aerosol properties retrieved from remote sensing by the GRASP algorithm

17. Yadong Hu, Xiaobin Sun, Jin Hong, Aiwen Zhang, Mengfan Li, Zhuoran Li, Zhen-wei Qiu, and Bin Suns, Atmospheric synchronization corrector for high resolution remote sensing images

18. Chan Huang, Shuang Li, Feinan Chen, Binghuan Meng, and Jing Hong, Directional Polarimetric Camera stray light analysis calibration and correction

19. Qing Kang, Yinlin Yuan, Xiaobing Zheng, Jianjun Li, Haoyu Wu, Wenchao Zhai, and Zhen Liu, Uncertainty analysis of calibration source with variable polarization degree in a wide dynamic range

20. Zhen Liu, Yin-Lin Yuan, Qing Kang, Jin Hong, and Xiao-Bing Zheng, Research on the radiometric calibration of the Spaceborne Directional Polarimetric Camera

21. Zhenwei Qiu, Shanshan Cui, and Qiang Hu, Design and preliminary performance test of a compact, stable on-board calibrator

22. Sergey Savenkov, Ivan Kolomiets, Yevgen Oberemok, and Alexander Kokhanovsky, Depolarization anisotropy of radiation scattered by soil and vegetation in the visible

23. P. Stähli, J. Ricka, M. Frenz, and H. G. Akarçay, Mode filtering for extinction measurements on strongly scattering systems

24. Fei Tao, Maoxin Song, Jin Hong, Xiaobing Sun, Guangfeng Xiang, Xuefeng Lei, and Xinxin Zhao, Efficient full field of view polarimetric calibration method for Simultaneous Imaging Polarimeter

Section 5: Advanced algorithms and data processing

25. Anatoli P. Chaikovsky, Vladislau A. Peshcharankou, and Andrey I. Bril, The selection and pre-processing algorithms of CALIOP lidar data

26. Xi Chen, Xiaoguang Xu, Jun Wang, and David J. Diner, Information content analysis of aerosol layer height from multi-angle polarized measurements in oxygen A and B bands

27. Alexander B. Kostinski and Yevgeny Derimian, Minimum principles in electromagnetic scattering by small aspherical particles: Extension to Differential Cross-Sections

28. Antonio Di Noia, Hartmut Boesch, Leif Vogel, Alex J. Webb, and Robert J. Parker, Use of polarization measurements for aerosol characterization in the UoL CO2 retrieval scheme

29. Cheng Fan, Guangliang Fu, Antonio Di Noia, Martijn Smit, Jeroen Rietjens, Sharon Burton, Zhengqiang Li, and Otto P. Hasekamp, Use of neural networks for aerosol retrievals over ocean from multi-angle spectro-polarimetric measurements

30. Li Fang, Tao Yu, Xingfa Gu, and Shupeng Wang, Retrieval of aerosol optical depth and aerosol model over East Asia from directional intensity and polarization measurements

31. David Fuertes, Oleg Dubovik, Fabrice Ducos, Tatyana Lapyonok, Pavel Litvinov, Anton Lopatin, Benjamin Torres, Yevgeny Derimian, Daniel Marth, Moritz Wanzenböck, Michael Aspetsberger, Andreas Hangler, and Stefan Amberger, Customizing GRASP general retrieval software for specific high-performance applications

32. Neranga Kaluappuwa Hannadige, Pengwang Zhai, and Meng Gao, Retrieval of aerosol and water leaving radiance properties over open and coastal oceans using multi-angle spectral polarimetric measurements

33. Weizhen Hou and Zhengqiang Li, An algorithm for aerosol remote sensing from multispectral single-viewing polarimetric measurements over land

34. Lei Li, Yevgeny Derimian, Huizheng Che, Oleg Dubovik, Gregory L. Schuster, Cheng Chen, Qiuyue Li, Yaqiang Wang, and Xiaoye Zhang, Retrievals of fine mode light absorbing particles from POLDER/PARASOL polarized observations over East and South Asia

35. Anton Lopatin, Oleg Dubovik, Gregory Schuster, Tatyana Lapyonok, Pavel Litvinov, Benjamin Torres, David Fuertes, Daniel Perez-Ramirez, Fabrice Ducos, Yevgeny Derimian, and Yana Karol, Synergy of lidar and polarimetric observations using GRASP algorithm for enhanced aerosol characterisation

36. Masanori Saito and Ping Yang, Observational constraint on particle shapes in optically thin ice clouds using CALIOP-IIR measurements

37. Han Wang, Xiaobing Sun, Jin Hong, Leiku Yang, and Meiru Zhao, Retrieval of aerosol optical depth from global measurements of Directional Polarimetric Camera using an adaptive algorithm

38. Shupeng Wang, Weihe Wang, Xingying Zhang, Peng Zhang, and Li Fang, Land aerosol retrieval with the Directional Polarimetric Camera aboard GF-5

39. Yisong Xie, Zhengqiang Li, Zhaozhou Li, Lin Cui, Zhaopeng Xu, Tianhua Li, Lili Qie, Weizhen Hou, and Hua Xu, Retrieval of fine-mode and total aerosol optical depth based on multi-angle, multi-band, polarization and intensity satellite measurements

40. M. Chakrouna, H. Chepferb, C. Bèsc, C. Evesqued, A. Feofilove, M. Chiriacof and V. Noelh, A comparison of different lidar configurations for cloud and aerosol measurements

Section 6 : Advanced atmospheric products from polarization

41. Cheng Chen, Oleg Dubovik, Daven K. Henze, Mian Chin, Tatyana Lapyonok, Gregory L. Schuster, Fabrice Ducos, David Fuertes, Pavel Litvinov, Lei Li, Anton Lopatin, Qiaoyun Hu, and Benjamin Torres, Constraining global species-specific aerosol emissions using satellite observations

42. Anna Gialitaki, Alexandra Tsekeri, Vassilis Amiridis, Romain Ceolato, Lucas Paulies, Eleni Marinou, Emmanouil Proestakis, Moritz Haarig, Holger Baars, and Albert Ansmann, Is the near-spherical shape the "new black" for smoke?

43. Moritz Haarig, Albert Ansmann, Holger Baars, Dietrich Althausen, Ronny Engelmann, and Ulla Wandinger, The spectral slope of the linear depolarization ratio measured with a triple-wavelength polarization lidar

44. Lin Tian, Peng Zhang, and Lin Chen, Estimation of the dust aerosol shortwave direct forcing over land based on an equi-albedo method from satellite measurements

45. Pucai Wang, Liang Ran, Zhaoze Deng, Xiangao Xia, Hongbin Chen, Sun Li, and Shenlan Zhang, Observational study of aerosol-cloud over Northern China

46. Xiaoguang Xu, Noah Sienkiewicz, Anin Puthukkudy, Brent McBride, Henrique M. J. Barbosa, J. Vanderlei Martins, and Lorraine Remer, Angular distribution of total and polarimetric land surface reflectance measured by AirHARP

Section 7 : Clouds, ocean color, and atmospheric correction

47. Feinan Chen, Chan Huang, Xiaobing Sun, Shuang Li, BingHuan Meng, Rui Sun, FanYi Zhe, and Jin Hong, Evaluation of the polarization radiance field of a sunglint model with different slope distributions using Directional Polarimetric Camera

48. Brent A. McBride, J. Vanderlei Martins, Henrique M. J. Barbosa, and William Birmingham, Spatial distribution of liquid water cloud droplet size properties retrieved from Airborne Hyper-Angular Rainbow Polarimeter (AirHARP) observations

49. Lorraine A. Remer, Yingxi Shi, Toby Westberry, Michael Behrenfeld, and Hongbin Yu, Understanding airborne fertilization of oceanic ecosystems using satellite products

50. Kenneth Sinclair, Brian Cairns, and Mikhail Alexandrov, An investigation of a cloud droplet size distribution's dispersion using remotely sensed observations

51. Xiaobing Sun, Yadong Hu, Xiangjing Wang, and Zhenwei Qiu, Atmospheric correction of satellite image using the in-orbit measured atmospheric data of Synchronization Monitoring Atmospheric Corrector (SMAC) instrument

52. Anna V. Zimovaya, Michail V. Tarasenkov, and Vladimir V. Belov, Atmospheric correction of satellite images of the Earth's surface with allowance for radiation polarization

53. Mohamed S. Djellali et al., Development of in-flight Calibration Methods using Specular Reflection for the Multi-Viewing, Multi-Channel, Multi-Polarization Imager (3MI)