**List of existing satellite aerosol dataset inter-comparisons**

**Status: 5 August 2015**

**Only such papers are included, where more than one satellite dataset is inter-compared (no single product validation papers)**

**Multiple algorithms from one sensor are compared in several cases**

**Near-surface particulate matter concentrations (PM2.5 or PM10) are not considered**

**Ocean AOD**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***publication*** | ***variables*** | ***method(s)*** | ***sensors*** |  | ***period*** | ***region(s)*** | ***reference(s)*** |
|  |  |  | ***VIIRS*** | ***SeaWIFS*** | ***AVHRR*** | ***TOMS*** | ***MODIS*** | ***MISR*** | ***POLDER*** | ***AATSR*** | ***MERIS*** | ***SYNAER*** | ***OMI*** | ***AIRS*** | ***IASI*** | ***CALIOP*** | ***SEVIRI*** |  |  |  |
| Smirnov, A., Holben, B. N., Giles, D. M., Slutsker, I., O'Neill, N. T., Eck, T. F., Macke, A., Croot, P., Courcoux, Y., Sakerin, S. M., Smyth, T. J., Zielinski, T., Zibordi, G., Goes, J. I., Harvey, M. J., Quinn, P. K., Nelson, N. B., Radionov, V. F., Duarte, C. M., Losno, R., Sciare, J., Voss, K. J., Kinne, S., Nalli, N. R., Joseph, E., Krishna Moorthy, K., Covert, D. S., Gulev, S. K., Milinevsky, G., Larouche, P., Belanger, S., Horne, E., Chin, M., Remer, L. A., Kahn, R. A., Reid, J. S., Schulz, M., Heald, C. L., Zhang, J., Lapina, K., Kleidman, R. G., Griesfeller, J., Gaitley, B. J., Tan, Q., and Diehl, T. L.: Maritime aerosol network as a component of AERONET – first results and comparison with global aerosol models and satellite retrievals, AMT, 4, 583-597, doi:10.5194/amt-4-583-2011, 2011. | AOD | Lv2 statistics |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  | 2006-2010 (80 cruises) | Global oceans | MAN |
| Kinne, S., Remote sensing data combinations-superior global maps for aerosol optical depth. In: Satellite Aerosol Remote Sensing Over Land, edited by A.Kokhanovsky and G. de Leeuw, Springer ISBN: 978-3-540-69396-3, 2009. | AOD | L3 scoring |  |  | x | x | x | x | x |  |  |  |  |  |  |  |  | Various multi-annual | Global ocean; regions | AERONET, SKYNET |
| Myhre, G., Stordal, F., Johnsrud, M., Diner, D. J., Geogdzhayev, I. V., Haywood, J. M., Holben, B., Holzer-Popp, T., Ignatov, A., Kahn, R., Kaufman, Y. J., Loeb, N., Martonchik, J., Mishchenko, M. I., Nalli, N. R., Remer, L. A., Schroedter-Homscheidt, M., Tanre, D., Torres, O., Wang, M., (2005) Intercomparison of satellite retrieved aerosol optical depth over ocean during the period September 1997 to December 2000, ACP, 5, 1697-1719, doi:10.5194/acp-5-1697-2005 | AOD | Monthly means |  | x | x | x | x | x |  |  |  | x |  |  |  |  |  | Various, 1997-2000 / 8M of 2000 | Global oceans; regions | AERONET, campaigns |
| Sayer, A. M., N. C. Hsu, C. Bettenhausen, Z. Ahmad, B. N. Holben, A. Smirnov, G. E. Thomas, and J. Zhang (2012), SeaWiFS Ocean Aerosol Retrieval (SOAR): Algorithm, validation, and comparison with other data sets, JGR, 117, D03206, doi:[10.1029/2011JD016599](http://dx.doi.org/10.1029/2011JD016599) | AOD | Lv3 |  | x |  |  | x | x |  | x | x |  |  |  |  |  |  | Multi-year | Global ocean | AERONET |
| A. Smirnov, B. N. Holben, S. M. Sakerin, D. M. Kabanov, I. Slutsker, M. Chin, T. L. Diehl, L. A. Remer, R. Kahn, A. Ignatov, L. Liu, M. Mishchenko, T. F. Eck, T. L. Kucsera, D. Giles and O. V. Kopelevich, Ship-based aerosol optical depth measurements in the Atlantic Ocean:Comparison with satellite retrievals and GOCART model, GRL, 33, L14817, doi:10.1029/2006GL026051, 2006 | AOD | Lv2  |  |  | x |  | x | x |  |  |  |  |  |  |  |  |  | Oct-Dec 2004 | Atlantic transsects | MAN |
| Kim, M.-H., S.-W. Kim, S.-C. Yoon and A. H. Omar, 2014: “Comparison of Aerosol Optical Depth between CALIOP and MODIS-Aqua for CALIOP Aerosol Subtypes over the Ocean”, *J. Geophys. Res.*, **118**, 13,241–13,252, doi:10.1002/2013JD019527. | AOD | Lv2  |  |  |  |  | x |  |  |  |  |  |  |  |  | x |  | 2006-2010 | oceans | - |
| Toth, T. D., J. Zhang, J. R. Campbell, J. S. Reid, Y. Shi, R. S. Johnson, A. Smirnov, M. A. Vaughan and D. M. Winker, 2013: “Investigating Enhanced Aqua MODIS Aerosol Optical Depth Retrievals over the Mid-to-High Latitude Southern Oceans through Intercomparison with Co-Located CALIOP, MAN, and AERONET Datasets”, *J. Geophys. Res.*, **118**, 4700–4714, doi:10.1002/jgrd.50311. | AOD | Lv3 |  | x | x |  | x | x |  |  |  |  |  |  |  | x |  | 2005, 2007-2009 | Southern oceans | AERONET, MAN |
| Petrenko, M. and Ichoku, C.: Coherent uncertainty analysis of aerosol measurements from multiple satellite sensors, Atmos. Chem. Phys., 13, 6777-6805, doi:10.5194/acp-13-6777-2013, 2013 | AOD | Lv2, co-registered |  | x |  |  | x | x | x |  |  |  | x |  |  | x |  | 2006-2010 | Global, regional | AERONET |
| Thomas, G. E., C. A. Poulsen, R. Siddans, A. M. Sayer, E. Carboni, S. H. Marsh, S. M. Dean, R. G. Grainger and B. N. Lawrence, 2010: “Validation of the GRAPE single view aerosol retrieval for ATSR-2 and insights into the long term global AOD trend over the ocean”, *Atmos. Chem. Phys.*, 10, 4849–4866, doi:10.5194/acp-10-4849-2010. | AOD | Lv3 |  |  | x |  |  |  |  | x |  |  |  |  |  |  |  | 1995-2001 | Global ocean | AERONET |

Ocean / properties

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***publication*** | ***variables*** | ***method(s)*** | ***sensors*** |  | ***period*** | ***region(s)*** | ***reference(s)*** |
|  |  |  | ***VIIRS*** | ***SeaWIFS*** | ***AVHRR*** | ***TOMS*** | ***MODIS*** | ***MISR*** | ***POLDER*** | ***AATSR*** | ***MERIS*** | ***SYNAER*** | ***OMI*** | ***AIRS*** | ***IASI*** | ***CALIOP*** | ***SEVIRI*** |  |  |  |
| Kahn, R. A., M. J. Garay, D. L. Nelson, K. K. Yau, M. A. Bull, B. J. Gaitley, J. V. Martonchik, and R. C. Levy (2007). Satellite-derived aerosol optical depth over dark water from MISR and MODIS: Comparisons with AERONET and implications for climatological studies.*JGR*, 112, D18205, doi:10.1029/2006JD008175. | AOD, ANG, size distribution, refr. indices | L2  |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  | 2001-2005 case studies | Over-water case studies | AERONET |

Land / AOD

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***publication*** | ***variables*** | ***method(s)*** | ***sensors*** |  | ***period*** | ***region(s)*** | ***reference(s)*** |
|  |  |  | ***VIIRS*** | ***SeaWIFS*** | ***AVHRR*** | ***TOMS*** | ***MODIS*** | ***MISR*** | ***POLDER*** | ***AATSR*** | ***MERIS*** | ***SYNAER*** | ***OMI*** | ***AIRS*** | ***IASI*** | ***CALIOP*** | ***SEVIRI*** |  |  |  |
| Kahn RA, Garay MJ, Nelson DL, Levy RC, Bull MA, Diner DJ, Martonchik JV, Hansen EG, Remer LA, Tanre´ D (2011) Response to ‘‘Toward unified satellite climatology of aerosol properties. 3. MODIS versus MISR versus AERONET.’’ JQSRT, 112:901–909. doi:10.1016/j.jqsrt.2009.11.003 | AOD | L2 statistics |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  | 3 months 2006 | Global | - |
| Liu, H., L. A. Remer, J. Huang, H.-C.Huang, S. Kondragunta, I. Laszlo, M. Oo,and J. M. Jackson (2014), Preliminaryevaluation of S-NPP VIIRS aerosol opticalthickness, J. Geophys. Res. Atmos., 119,3942–3962, doi:10.1002/2013JD020360. | AOD | L2 statistics | x |  |  |  | x |  |  |  |  |  |  |  |  |  |  | 2012/13 | global | AERONET, MAN |
| Kinne, S., U. Lohmann, J. Feichter, M. Schulz, C. Timmreck, S. Ghan, R. Easter, M. Chin, P. Ginouz, T. Takemura, I. Tegen, D. Koch, M. Herzog, J. Penner, G. Pitari, B. Holben, T. Eck, A. Smirnov, O. Dubovik, I. Slutsker, D. Tanre, O. Torres, M. Mishchenko, I. Geogdzhayev, D.A. Chu, and Y. Kaufman, 2003: Monthly averages of aerosol properties: A global comparison among models, satellite data, and AERONET ground data. JGR, 108, 4634, doi:10.1029/2001JD001253 | AOD | Monthly means |  |  | x | x | x |  |  |  |  |  |  |  |  |  |  |  | global | AERONET, AEROCOM |
| C. Kittaka, D. M.Winker, M. A. Vaughan, A. Omar, and L. A. Remer, Intercomparison of column aerosol optical depths from CALIPSO and MODIS-Aqua (2011), AMT, 4, 131–141,www.atmos-meas-tech.net/4/131/2011/doi:10.5194/amt-4-131-2011 | AOD | Collocated pairs, 5 deg grid |  |  |  |  | x |  |  |  |  |  |  |  |  | x |  | 2006-2008 | global | - |
| Sayer, A. M., Hsu, N. C., Bettenhausen, C., Jeong, M.-J., Holben, B. N., and Zhang, J.: Global and regional evaluation of over-land spectral aerosol optical depth retrievals from SeaWiFS, AMT, 5, 1761-1778, doi:10.5194/amt-5-1761-2012, 2012. | AOD | Lv3 |  | x |  |  | x | x |  |  |  |  |  |  |  |  |  | Multi-year | global | AERONET |
| J. Li, B. E. Carlson,1 and A. A. Lacis (2013), Application of spectral analysis techniques in the intercomparisonof aerosol data: 1. An EOF approach to analyze thespatial-temporal variability of aerosol opticaldepth using multiple remote sensing data sets, JGR, 118, 8640–8648, doi:10.1002/jgrd.50686 | AOD | PCA analysis |  | x |  |  | x | x |  |  |  |  |  |  |  |  |  | 2002-2010 | Global ocean | - |
| Redemann, J., Vaughan, M. A., Zhang, Q., Shinozuka, Y., Russell, P. B., Livingston, J. M., Kacenelenbogen, M., and Remer, L. A.: The comparison of MODIS-Aqua (C5) and CALIOP (V2 & V3) aerosol optical depth, Atmos. Chem. Phys., 12, 3025-3043, doi:10.5194/acp-12-3025-2012, 2012 | AOD | L2 |  |  |  |  | x |  |  |  |  |  |  |  |  | X |  | (Jan., Apr., Jul., Oct. 2007 & 2009) | Global along CALIOP track | - |
| Ma, X., K. Bartlett, K. Harmon, and F. Yu, 2013: “Comparison of AOD between CALIPSO and MODIS: significant differences over major dust and biomass burning regions”, *Atmos. Meas. Tech.*, **6**, 2391–2401, doi:10.5194/amt-6-2391-2013 | AOD | Lv3 monthly |  |  |  |  | x |  |  |  |  |  |  |  |  | x |  | 2006-2011 | Global, focus: dust, biomass burning regions | Model (GEOS-CHEM) |
| Petrenko, M. and Ichoku, C.: Coherent uncertainty analysis of aerosol measurements from multiple satellite sensors, Atmos. Chem. Phys., 13, 6777-6805, doi:10.5194/acp-13-6777-2013, 2013 | AOD | Lv2, co-registered |  | x |  |  | x | x | x |  |  |  | x |  |  | x |  | 2006-2010 | Global, regional | AERONET |
| Ahn, C., O. Torres, and H. Jethva (2014), Assessment of OMI near-UV aerosol optical depth over land, J. Geophys. Res. Atmos., 119, 2457–2473, doi:[10.1002/2013JD020188](http://dx.doi.org/10.1002/2013JD020188) | AOD |  |  |  |  |  | x | x |  |  |  |  | x |  |  |  |  | 2005-2014 | Global | Aeronet |
| Ahn, C., O. Torres, and P. K. Bhartia (2008), Comparison of Ozone Monitoring Instrument UV Aerosol Products withAqua/Moderate Resolution Imaging Spectroradiometer and Multiangle Imaging Spectroradiometer observations in 2006, J. Geophys.Res., 113, D16S27, doi:10.1029/2007JD008832 | AOD | Lv2, lv3 |  |  |  |  | x | x |  |  |  |  | x |  |  |  |  | 2006 / 2007 sel. days | Sel. regions | - |
| Sayer, A. M., L. A. Munchak, N. C. Hsu, R. C. Levy, C. Bettenhausen, and M.-J. Jeong (2014), MODIS Collection 6 aerosol products: Comparison between Aqua's e-Deep Blue, Dark Target, and “merged” data sets, and usage recommendations, J. Geophys. Res. Atmos., 119, doi:10.1002/2014JD022453. | AOD (several MODIS algorithms) | Lv2 |  |  |  |  | x |  |  |  |  |  |  |  |  |  |  |  | global | AERONET |

Land /AOD, ANG

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***publication*** | ***variables*** | ***method(s)*** | ***sensors*** |  | ***period*** | ***region(s)*** | ***reference(s)*** |
|  |  |  | ***VIIRS*** | ***SeaWIFS*** | ***AVHRR*** | ***TOMS*** | ***MODIS*** | ***MISR*** | ***POLDER*** | ***AATSR*** | ***MERIS*** | ***SYNAER*** | ***OMI*** | ***AIRS*** | ***IASI*** | ***CALIOP*** | ***SEVIRI*** |  |  |  |
| R A. Kahn, D L. Nelson, M J. Garay, R C. Levy, M A. Bull, David J. Diner, John V. Martonchik, S R. Paradise, E G. Hansen, and L A. Remer (2009), MISR Aerosol Product Attributes and Statistical Comparisons With MODIS, TGARS 47, 4095-4111, doi: 10.1109/TGRS.2009.2023115 | AOD, ANG | L2 statistics |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  | 2M of 2006 | Global | - |
| F.-M. Bréon, A. Vermeulen, J. Descloitres, An evaluation of satellite aerosol products against sunphotometer measurements (2011), RSE 115, 3102 | AOD, ANG | L2 statistics |  |  |  |  | x |  | x |  | x |  |  |  |  | x | x | various, 2006-2008 | global; ocean/land | AERONET |
| de Leeuw, G., T. Holzer-Popp, S. Bevan, W. Davies, J. Descloitres, R.G. Grainger, J. Griesfeller, A. Heckel, S. Kinne, L. Klüser, P. Kolmonen, P. Litvinov, D. Martynenko, P.J.R. North, B. Ovigneur, N. Pascal, C. Poulsen, D. Ramon, M. Schulz, R.Siddans, L. Sogacheva, D. Tanré, G.E. Thomas, T.H. Virtanen, W. von Hoyningen Huene, M.Vountas, S. Pinnock, Evaluation of seven European aerosol optical depth retrieval algorithms for climate analysis, RSE (2014) doi: 10.1016/j.rse.2013.04.023 | AOD, ANG | Lv2 statisticsL3 statisticsL3 scoring |  |  |  |  | x | x | x | x | x | x |  |  |  |  |  | 4M of 2008 | global; ocean land, regions, seasons | AERONET |
| Holzer-Popp, T., de Leeuw, G., Martynenko, D., Klüser, L., Bevan, S., Davies, W., Ducos, F., Deuzé, J. L., Graigner, R. G., Heckel, A., von Hoyningen-Hüne, W., Kolmonen, P., Litvinov, P., North, P., Poulsen, C. A., Ramon, D., Siddans, R., Sogacheva, L., Tanre, D., Thomas, G. E., Vountas, M., Descloitres, J., Griesfeller, J., Kinne, S., Schulz, M., and Pinnock, S., Aerosol retrieval experiments in the ESA Aerosol\_cci project, AMT, 6, 1919 - 1957, (2013) doi:10.5194/amt-6-1919-2013 | AOD, ANG | L3 statisticsalgorithm experiments (sensitivities) |  |  |  |  | x | x | x | x | x | x |  |  |  |  |  | 1M of 2008 | Global; ocean land, regions | AERONET |

Land / properties / theoretical analysis

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***publication*** | ***variables*** | ***method(s)*** | ***sensors*** |  | ***period*** | ***region(s)*** | ***reference(s)*** |
|  |  |  | ***VIIRS*** | ***SeaWIFS*** | ***AVHRR*** | ***TOMS*** | ***MODIS*** | ***MISR*** | ***POLDER*** | ***AATSR*** | ***MERIS*** | ***SYNAER*** | ***OMI*** | ***AIRS*** | ***IASI*** | ***CALIOP*** | ***SEVIRI*** |  |  |  |
| Kokhanovsky, A. A., Deuzé, J. L., Diner, D. J., Dubovik, O., Ducos, F., Emde, C., Garay, M. J., Grainger, R. G., Heckel, A., Herman, M., Katsev, I. L., Keller, J., Levy, R., North, P. R. J., Prikhach, A. S., Rozanov, V. V., Sayer, A. M., Ota, Y., Tanré, D., Thomas, G. E., and Zege, E. P (2010), The inter-comparison of major satellite aerosol retrieval algorithms using simulated intensity and polarization characteristics of reflected light, AMT, 3, 909-932, doi:10.5194/amt-3-909-2010 | AOD, optical properties | Simulations |  |  |  |  | x | x | x | x | x |  |  |  |  |  |  | Single cases | Single cases | - |
| Knobelspiesse, K., Cairns, B., Mishchenko, M., Chowdhary, J., Tsigaridis, K., van Diedenhoven, B., Martin, W., Ottaviani, M., and Alexandrov, M., 2012: Analysis of fine-mode aerosol retrieval capabilities by different passive remote sensing instrument designs. *Opt. Express*, 20 (19), 21457-21484. | AOD, fine mode AOD | information content analysis (Rogers method) |  |  |  |  |  | x | x |  |  |  |  |  |  |  |  | 2 scenes / 6 aerosol types, 5 AOD values | 2 scenes (land, ocean) | Input from AERONET, model (OsloCTM2) |
| Zubko, V., Kaufman, Y. J., Burg, R. I., and Martins, J. V., 2007: Principal component analysis of remote sensing of aerosols over oceans. *Geoscience and Remote Sensing, IEEE Transactions on*, 45 (3), 730--745. | AOD, optical properties | Principal component analysis |  |  | x |  | x | x | x |  |  |  |  |  |  |  |  | Several aerosol condi-tions | oceans | Principal component analysis |

Dust

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***publication*** | ***variables*** | ***method(s)*** | ***sensors*** |  | ***period*** | ***region(s)*** | ***reference(s)*** |
|  |  |  | ***VIIRS*** | ***SeaWIFS*** | ***AVHRR*** | ***TOMS*** | ***MODIS*** | ***MISR*** | ***POLDER*** | ***AATSR*** | ***MERIS*** | ***SYNAER*** | ***OMI*** | ***AIRS*** | ***IASI*** | ***CALIOP*** | ***SEVIRI*** |  |  |  |
| Carboni, E., Thomas, G. E., Sayer, A. M., Siddans, R., Poulsen, C. A., Grainger, R. G., Ahn, C., Antoine, D., Bevan, S., Braak, R., Brindley, H., DeSouza-Machado, S., Deuzé, J. L., Diner, D., Ducos, F., Grey, W., Hsu, C., Kalashnikova, O. V., Kahn, R., North, P. R. J., Salustro, C., Smith, A., Tanré, D., Torres, O., and Veihelmann, B. (2012), Intercomparison of desert dust optical depth from satellite measurements, AMT, 5, 1973-2002, doi:10.5194/amt-5-1973-2012 | Dust AOD | L3 statistics |  |  |  |  | x | x | x | x | x |  | x | x |  |  | x | March 2006 | Saharan Dust Plume | AERONET |
| Banks, J.R., Brindley, H.E., Flamant, C., Garay, M.J., Hsu, N.C., Kalashnikova, O.V., Klüser, L., Sayer, A.M. (2013), Intercomparison of satellite dust retrieval products over the west African Sahara during the Fennec campaign in June 2011, RSE, 136, 99-116, http://dx.doi.org/10.1016/j.rse.2013.05.003 | Dust AOD | Lv2 statistics |  |  |  |  | x | x |  |  |  |  |  |  | x |  | x | June 2011 | Sahara | AERONET + Fennek campaign (ground, air, lidar) |
| Peyridieu, S., A. Chédin, D. Tanré, V. Capelle, C. Pierangelo, N. Lamquin, and R. Armante, 2010: “Saharan dust infrared optical depth and altitude retrieved from AIRS: a focus over North Atlantic – comparison to MODIS and CALIPSO”, *Atmos. Chem. Phys.*, **10**, 1953–1967, doi:10.5194/acp-10-1953-2010 | Dust AOD,altitude | Lv3 monthly |  |  |  |  | x |  | x |  |  |  |  |  |  | x |  | 2003-2009 | Tropical Atlantic | AERONET (1 station) |
| Peyridieu, S., A. Chédin, V. Capelle, C. Tsamalis, C. Pierangelo, R. Armante, C. Crevoisier, L. Crépeau, M. Siméon, F. Ducos and N. A. Scott, 2013: “Characterisation of dust aerosols in the infrared from IASI and comparison with PARASOL, MODIS, MISR, CALIOP, and AERONET observations”, *Atmos. Chem. Phys.*, **13**, 6065–6082, doi:10.5194/acp-13-6065-2013 | Dust AOD | Lv3 monthly |  |  |  |  | x | x | x |  |  |  |  |  | x | x |  | 2007-2011 | Atlantic, Arabian sea | AERONET |