Our ref: 24/047
4 March 2024

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florence.rabier@ecmwf.int

Dear Dr. Privette, Chair of the CEOS-CGMS Working Group on Climate,

In response to your message of 18 January, I am pleased to nominate Dr. Vincent-Henri Peuch for the role of Vice Chair of the CEOS-CGMS Working Group on Climate. In case he is appointed, with this letter, I confirm that ECMWF will give him the time and provide the resources required to perform the corresponding duties in the best possible way and for the benefit of all the CEOS-CGMS entities.

Vincent-Henri has been working for ECMWF since 2011 and he has been instrumental to the definition and implementation of Copernicus Services at ECMWF. He is currently the Director for engagement with the European Union and he heads the ECMWF Bonn office, which is the centre of gravity of our contributions to European programmes and initiatives such as Copernicus and Destination Earth. Before joining ECMWF, he has worked for 15 years at Météo-France, the French National Weather Service. This track record within meteorological agencies, together with his long-standing experience as a scientist in modelling and data assimilation of atmospheric composition and greenhouse gases, as well as his active role in different international scientific and steering bodies (including WMO's Global Atmospheric Watch and Global Greenhouse Gas Watch Study Group, WHO's Global Air Pollution and Health Technical Advisory Group and ESA's Advisory Committee for Earth Observation and Climate Science Advisory Board) are strong assets that can support the continuing success of the Working Group on Climate. His curriculum vitae and list of publications are attached for your information.

In closing, I thank you in advance for considering the nomination of Dr. Peuch.

Yours sincerely,

Dr Florence Rabier
Director-General

Enc.

europass

Vincent-Henri Peuch

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Website: http://www.ecmwf.int **Twitter:** http://twitter.com/VHPeuch

LinkedIn: http://www.linkedin.com/in/vincent-henri-peuch-33a3b954/

Date of birth: 28/11/1970 **Nationality:** French

WORK EXPERIENCE

[01/01/2024 – Current]

Director for Engagement with the European Union and Head of ECMWF Bonn site

European Centre for Medium-Range Weather Forecasts

City: Bonn

Country: Germany

- Member of ECMWF Directorate (grade A6).
- Responsible for strategic coordination of all EU-related activities at ECMWF: Copernicus, Destination Earth, and other European projects (Horizon Europe, Digital Europe and others).
- Main interface with the EU for strategic matters, such as negotiations of new contribution agreements, presentations of ECMWF strategy and requirements for new calls.
- Support the Director-General and Directorate in cross-cutting strategic matters.
- Head of the Bonn site, currently hosting over 180 ECMWF staff.
- Internationally respected scientist on atmospheric environment research and co-author of 105 peer-reviewed publications (according to Research Gate: h-index = 48, Research Interest Score = 3152, citations = 8.1k).
- Member of the Steering Committee of the World Meteorological Organization's Global Atmospheric Watch Programme and co-chair of WMO's Study Group on Greenhouse Gas; member of the Global Air Pollution and Health Technical Advisory Group of the World Health Organization; member of the Advisory Committee on Earth Observation and of the Climate Science Advisory Board of the European Space Agency; member or former member of scientific committees of European and national institutions in France (current chair of the Scientific Committee of the national environment agency INERIS), Germany (Advisory Board of the Karlsruher Institute für Technologie), Singapore and the United States.

[01/10/2021 – 31/12/2023]

Director of the Copernicus Atmosphere Monitoring Service

European Centre for Medium-Range Weather Forecasts

City: Bonn

Country: Germany

- My position moved from Reading (UK) to Bonn (Germany) with duties unchanged.
- I was promoted in 2022 as high-ranking French civil servant ("Ingénieur Général des Ponts, des Eaux et des Forêts").

[31/05/2015 – 30/09/2021]

Director of the Copernicus Atmosphere Monitoring Service

European Centre for Medium-Range Weather Forecasts

City: Reading

Country: United Kingdom

- Member of the Leadership Team of ECMWF and Deputy Director of the Copernicus Services Department (grade A5).
- Director of the Copernicus Atmosphere Monitoring Service (CAMS), which is implemented by ECMWF on behalf of the European Commission with a budget of 170M€ for the period 2021-2027. CAMS involves both staff within ECMWF and in about 40 consortia of contractors distributed in Europe. I oversee the delivery of all activities, including engagement with stakeholders (particularly DG DEFIS and other Directorates General of the European Commission) and users.
- Under my leadership, CAMS has become a mainstream source of Earth Observation based atmospheric composition information both in the public (World Meteorological Organization, the European Environment Agency, national environment agencies...) and in the commercial domains (CNN, Euronews, The Weather Channel, Apple, Google, Windy...).
- I have led the definition and initial pilot implementation of ECMWF's strategy on Cloud Computing and Big Data. Since then, I have been involved in the coordination of related activities between Copernicus (including representation of ECMWF in the WEkEO supervisory board), Destination Earth and ECMWF "core" activities.

[31/08/2011 – 30/05/2015]

Head of the Atmospheric Composition Division

European Centre for Medium-Range Weather Forecasts, Research Department

City: Reading

Country: United Kingdom

- Member of the Leadership Team of ECMWF (grade A5).
- Division Head in the Research Department, with responsibility over one section (10 staff) and dotted management of 4 staff in the Forecast Department.
- Co-ordinator of the European projects MACC-II and MACC-III (Monitoring Atmospheric Composition and Climate, phase II and phase III). These projects involved about 200 scientists from 36 partner institutions in 13 countries.
- Lead research activities on data assimilation of satellite observations and modelling of atmospheric composition in ECMWF Integrated Forecasting System and on links between atmospheric composition and weather/climate.
- Lead role in the acquisition for ECMWF of the Delegation Agreement by the European Commission for the implementation of the Copernicus Atmosphere Monitoring and Climate Change Services.

[31/01/2005 – 30/08/2011]

Head of Research Section

Météo-France, National Centre for Meteorological Research (CNRM)

City: Toulouse

Country: France

- High-ranking French civil servant ("Ingénieur en Chef des Ponts, des Eaux et des Forêts").
- Leader of a Research Section in the Division "Large scales and Climate Modelling" of Météo-France's Research Centre, comprising 15-20 scientists, post-docs and PhDs (I have supervised 11 doctoral theses in the period) investigating atmospheric composition topics. A major focus was on the assimilation and use of satellite data, including prominently from instruments onboard ENVISAT.
- Management of European air quality aspects in Copernicus precursor R&D activities since 2003.
- Co-proposer and Principal Investigator for Météo-France of 8 European projects in the 5th, 6th and 7th Framework Programmes.
- Responsible for delivery, support and upgrade of Météo-France's operational numerical modelling tools for exerting its mandates in case of nuclear accidents, volcanic eruptions or of exceptional events related to air quality and atmospheric composition; contribution to associated crisis communications in press and media.

[31/08/1997 – 30/01/2005]

Research Scientist

Météo-France, National Centre for Meteorological Research (CNRM)

City: Toulouse

Country: France

- High-ranking French civil servant ("Ingénieur des Ponts, des Eaux et des Forêts").
- I have carried out research on numerical modelling and data assimilation of atmospheric composition, including pioneering work (worldwide) on three-dimensional regional Air Quality forecasting.
- I have designed and led the development of Météo-France's numerical model for environmental forecasting applications (Mocage), supporting also climate-chemistry and Earth-System research.
- I have led international modelling activities for the research field campaign ESCOMPTE (2000-2001), involving a dozen groups from Europe and the US.

EDUCATION AND TRAINING

[31/08/1990 – 27/06/1996]

PhD

Ecole Normale Supérieure de Lyon

City: Lyon

Country: France

Level in EQF: EQF level 8

Ecole Normale Supérieure de Lyon is among the most competitive French "Grandes Ecoles". As "Normalien", I have followed a fast-tracked academic curriculum in theoretical physics and chemistry and obtained a PhD with "félicitations du jury" (defense in June 1996). My thesis was about numerical modelling of elementary steps involved in catalytic reactions based on "ab initio" quantum physics and using high-performance computing. In parallel of my PhD research, I did my compulsory military service as teacher in physics for "Classes Préparatoires aux Grandes Ecoles" (post-baccalaureate) from July 1994 to July 1995.

[31/08/1995 – 30/08/1997]

Ingénieur Civil de la Météorologie

Ecole Nationale de la Météorologie

City: Toulouse

Country: France

Level in EQF: EQF level 7

Mandatory training for high-ranking civil servants joining Météo-France, comprising meteorological sciences as well as management and administration classes.

[20/09/2015 – 31/05/2016]

Executive Master in Management of International Organizations

SDA Bocconi School of Management, ITC-ILO, United Nations System Staff College

City: Milan

Country: Italy

Level in EQF: EQF level 7

Executive Master course specially targeted for high-level management of International Multilateral Organizations. It included modules on: "envisioning and innovating", "managing and leading" and "managing resources and operations".

LANGUAGE SKILLS

Mother tongue(s): French

Other language(s):

English

LISTENING C2 **READING** C2 **WRITING** C2

SPOKEN PRODUCTION C2 **SPOKEN INTERACTION** C2

German

LISTENING A2 **READING** B1 **WRITING** A2

SPOKEN PRODUCTION A2 **SPOKEN INTERACTION** A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Microsoft Office | Social Media

ORGANISATIONAL SKILLS

Organisational skills

- People management of (internal and distributed) teams and contribution to the overall leadership of ECMWF.
- Stakeholder engagement with the European Commission (DG-CLIMA, DG-DEFIS, DG-ENER, DG-ENV, DG-INTPA, DG-JRC, DG-RTD, DG-SANTE), the European Council (representatives to the Space Working Party) and Member States' delegates to ECMWF and the Copernicus programme.
- Acquiring, planning and managing the delivery of large and complex projects.
- Extensive experience of the transposition of research results into operational implementation, with a user-driven and/or co-design approach.

COMMUNICATION AND INTERPERSONAL SKILLS

Communication and interpersonal skills

- Wide experience with communicating to media/press, including live interviews for television and radio.
- Regularly invited as keynote speaker for varied events, from large scientific symposia to general public conferences.
- Internal communications within the teams I have been in charge over the years, including for running very large and distributed international projects.
- Teaching experience for over ten years at Ecole Nationale de la Météorologie and for three years at Ecole Nationale des Ponts et Chaussées (France).

Peer-reviewed publications **Vincent-Henri Peuch** **Date: February 2024**

In preparation, submitted or on-line discussion

108. S. Cai , F. Fang, V.-H. Peuch , M. Alexe , I. Navon and Y. Wang, 2024: Advancing operational PM2.5 forecasting with dual deep neural networks (D-DNet), *Nature*, submitted.

107. H. Eskes , A. Tsikerdekis , M. Ades, M. Alexe, A. C. Benedictow , Y. Bennouna, L. Blake , I. Bouarar, S. Chabrillat , R. Engelen , Q. Errera , J. Flemming , S. Garrigues, J. Griesfeller, V. Huijnen , L. Ilic , A. Inness , J. Kapsomenakis, Z. Kipling , B. Langerock, A. Mortier , M. Parrington , I. Pison , M. Pitkanen , S. Remy , A. Richter , A. Schoenhardt, M.Schulz , V. Thouret, T. Warneke, C. Zerefos, and V.-H. Peuch, 2024: Technical Note: Evaluation of the Copernicus Atmosphere Monitoring Service Cy48R1 upgrade of June 2023, *Atmos. Chem Phys. Discuss.*, https://doi.org/10.5194/egusphere-2023-3129, 2024.

106. T. Bourdrel, L. Zabrocki, N. Compte, B. Bravenboer, R. Decours, L. De Decker, L. Le Jumeau de Kergaradec, M. Lilamand, C. Roubaud Baudron, B. Fougères, R. Mahmoudi, B. Schorr, G. Kaltenbach, H. Pellerin, T. Vogel, V.-H. Peuch, M.-A. Bind, 2023: Individual and Environmental Risk Factors for COVID-19 Mortality in Elderly, *J. Environ. Health Sci. and Eng.*, submitted.

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105. J. Yu, C. H. Song, D. Lee, H. S. Kim, M. G. Jeon, J. H. Lim, S.-Y. Park, V.-H. Peuch, P. E. Saide, G. R. Carmichael, J.H. Kim, J. Kim, C. K. Song, J. H. Woo and S.-H. Ryu, 2023: Synergistic combination of information from air quality modeling, ground observations, GEO satellite, and machine learning towards improved PM2.5 predictability, *npj Clim. Atm. Sci.*, 6, 41 (2023), https://doi.org/10.1038/s41612-023-00363-w.

104. A. Agusti-Panareda, J. Barre, S. Massart, A. Inness, I. Aben, M. Ades, B. Baier, G. Balsamo, T. Borsdorff, N. Bousserez, S. Boussetta, M. Buchwitz, L. Cantarello, C. Crevoisier, R. Engelen, H. Eskes, J. Flemming, S. Garrigues, O. Hasekamp, V. Huijnen, L. Jones, Z. Kipling, B. Langerock, J. McNorton, N. Meilhac, S. Noel, M. Parrington, V.-H. Peuch, M. Ramonet, M. Ratzinger, M. Reuter, R. Ribas, M. Suttie, C. Sweeney, J. Tarniewicz, and L. Wu, 2023: Technical note: The CAMS greenhouse gas reanalysis from 2003 to 2020, *Atmos. Chem. Phys.*, 23, 3829–3859, https://doi.org/10.5194/acp-23-3829-2023.

103. S. Garrigues, M. Ades, S. Remy, J. Flemming, Z. Kipling, I. laszlo, M. Parrington, A. Inness, R. Ribas, L. Jones, R. Engelen, and V.-H. Peuch, 2023: Impact of assimilating NOAA VIIRS Aerosol Optical Depth (AOD) observations on global AOD analysis from the Copernicus Atmosphere Monitoring Service (CAMS), *Atmos. Chem. Phys.*, 23, 10473–10487, https://doi.org/10.5194/acp-23-10473-2023.

102. J. Douros, H. Eskes, J. van Geffen, F. K. Boersma, S. Compernolle, G. Pinardi, A.-M. Blechschmidt, V.-H. Peuch, A. Colette, and P. Veefkind, 2023: Comparing Sentinel-5P TROPOMI NO_2 column observations with the CAMS-regional air quality ensemble, *Geophys. Mod. Dev.,* 16, 509–534, https://doi.org/10.5194/gmd-16-509-2023.

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101. V.-H. Peuch, R. Engelen, M. Rixen, D. Dee, J. Flemming, M. Suttie, M. Ades, A. Agustí-Panareda, C. Ananasso, E. Andersson, D. Armstrong, J. Barré, N. Bousserez, J. J. Dominguez, S. Garrigues, A. Inness, L. Jones, Z. Kipling, J. Letertre-Danczak, M. Parrington, M. Razinger, R. Ribas, S. Vermoote, X. Yang, A. Simmons, J. Garcés de Marcilla and J.-N. Thépaut, 2022: The Copernicus Atmosphere Monitoring Service: from research to operations, *Bull. Am. Meteor. Soc.*, https://doi.org/10.1175/BAMS-D-21-0314.1.

100. S. Garrigues, S. Remy, J. Chimot, M. Ades, A. Inness, J. Flemming, Z. Kipling, I. laszlo, A. Benedetti, R. Ribas, S. Jafariserajehlou, B. Fougnie, S. Kondragunta, R. Engelen, V.-H. Peuch, M. Parrington, N. Bousserez, M. Vazquez Navarro, and A. Agusti-Panareda, 2022: Monitoring multiple satellite Aerosol Optical Depth (AOD) products within the Copernicus Atmosphere Monitoring Service (CAMS) data assimilation system, *Atmos. Chem. Phys.*, https://doi.org/10.5194/acp-22-14657-2022.

99. M. Guevara, H. Petetin, O. Jorba, H. A.C. Denier van der Gon, J. Kuenen, I. Super, J.-P. Jalkanen, E. Majamäki, L. Johansson, V.-H. Peuch, and C. Pérez García-Pando, 2022: European primary emissions of criteria pollutants and greenhouse gases in 2020 modulated by the COVID-19 pandemic disruptions, *Earth Syst. Sci. Data*, 14, 2521–2552, https://doi.org/10.5194/essd-14-2521-2022.

98. S. Rémy, Kipling, Z., Huijnen, V., Flemming, J., Nabat, P, Michou, M., Ades, M., Engelen, R. and V.-H. Peuch, 2022: Description and evaluation of the tropospheric aerosol scheme in the Integrated Forecasting System (IFS-AER, cycle 47R1) of ECMWF, *Geophys. Mod. Dev.*, 15, 4881–4912, https://doi.org/10.5194/gmd-15-4881-2022.

97. R. Schneider, P. Masselot, A. M. Vicedo-Cabrera, F. Sera, M. Blangiardo, C. Forlani, J. Douros, O. Jorba, M. Adani, R. Kouznetsov, F. Couvidat, J. Arteta, B. Raux, M. Guevara, A. Colette, J. Barré, V.-H. Peuch, and A. Gasparrini, 2022: Differential impact of government lockdown policies on reducing air pollution levels and related mortality in Europe, *Nature Sci. Rep.*, 12, 726 (2022), https://doi.org/10.1038/s41598-021-04277-6.

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96. H. Brenot, Theys, N., Clarisse, L., van Gent, J., Hurtmans, D. R., Vandenbussche, S., Papagiannopoulos, N., Mona, L., Virtanen, T., Uppstu, A., Sofiev, M., Bugliaro, L., Vázquez-Navarro, M., Hedelt, P., Parks, M. M., Barsotti, S., Coltelli, M., Moreland, W., Arnold-Arias, D., Hirtl, M., Peltonen, T., Lahtinen, J., Sievers, K., Lipok, F., Rüfenacht, R., Haefele, A., Hervo, M., Wagenaar, S., Som de Cerff, W., de Laat, J., Apituley, A., Stammes, P., Laffineur, Q., Delcloo, A., Lennart, R., Rokitansky, C.-H., Vargas, A., Kerschbaum, M., Resch, C., Zopp, R., Plu, M., Peuch, V.-H., Van Roozendael, M., and G. Wotawa, 2021: EUNADICS early warning system dedicated to support aviation in case of crisis from natural airborne hazard and radionuclide cloud, *Nat. Hazards Earth Syst. Sci.*, 11, 3367-3405, https://doi.org/10.5194/nhess-21-3367-2021.

95. X. Ye, P. Arab, R. Ahmadov, E. James, G. A. Grell, B. Pierce, A. Kumar, P. Makar, J. Chen, D. Davignon, G. Carmichael, G. Ferrada, J. McQueen, J. Huang, R. Kumar, L. Emmons, F. L. Herron-

Thorpe, M. Parrington, Ri. Engelen, V.-H. Peuch, A. da Silva, A. Soja, E. Gargulinski, E. Wiggins, J. W. Hair, M. Fenn, T. Shingler, S. Kondragunta, A. Lyapustin, Y. Wang, B. Holben, D. Giles and P. E. Saide, 2021: Evaluation and intercomparison of wildfire smoke forecasts from multiple modeling systems for the 2019 Williams Flats fire, *Atmos. Chem. Phys.*, 21, 14427–14469, 2021, https://doi.org/10.5194/acp-21-14427-2021.

94. R. S. Sokhi, V. Singh, X. Querol, S. Finardi, A. Créso Targino, M. de Fatima Andrade, R. Pavlovic, R. M. Garland, J. Massagué, S. Kong, A. Baklanov, L. Ren, O. Tarasova, G. Carmichael, V.-H. Peuch, V. Anand, G. Arbilla, K. Badali, G. Beig, L. C. Belalcazar, A. Bolignano, P. Brimblecombe, P. Camacho, A. Casallas, J.-P. Charland, J. Choi, E. Chourdakis, I. Coll, M. Collins, J. Cyrys, C. Martins da Silva, A. D. Di Giosa, A. Di Leo, C. Ferro, M. Gavidia-Calderon, A. Gayen, A. Ginzburg, F. Godefroy, Y. Alexandra Gonzalez, M. Guevara-Luna, Sk. M. Haque, H. Havenga, D. Herod, U. Hõrrak, T. Hussein, S. Ibarra, M. Jaimes, M. Kaasik, R. Khaiwal, J. Kim, A. Kousa, J. Kukkonen, M. Kulmala, J. Kuula, N. La Violette, G. Lanzani, X. Liu, S. MacDougall, P. M. Manseau, G. Marchegiani, B. McDonald, S. Vardhan Mishra, L. T. Molina, D. Mooibroek, S. Mor, N. Moussiopoulos, F. Murena, J. V. Niemi, S. Noe, T. Nogueira, M. Norman, J. L. Pérez-Camaño, T. Petäjä, S. Piketh, A. Rathod, K. Reid, A. Retama, O. Rivera, N. Y. Rojas, J. P. Rojas, R. San José, O. Sánchez, R. J. Seguel, S. Sillanpää, Y. Su, N. Tapper, A. Terrazas, H. Timonen, D. Toscano, G. Tsegas, G. J. M. Velders, C. Vlachokostas, E. von Schneidemesser, R. VPM, R. Yadav, R. Zalakeviciute and M.l Zavala, 2021: A global observational analysis to understand changes in air quality during exceptionally low anthropogenic emission conditions, *Env. Int*., in press.

93. J. Barré, Petetin, H., Colette, A., Guevara, M., Peuch, V.-H., Rouil, L., Engelen, R., Inness, A., Flemming, J., Pérez García-Pando, C., Bowdalo, D., Meleux, F., Geels, C., Christensen, J. H., Gauss, M., Benedictow, A., Tsyro, S., Friese, E., Struzewska, J., Kaminski, J. W., Douros, J., Timmermans, R., Robertson, L., Adani, M., Jorba, O., Joly, M., and Kouznetsov, R., 2020: Estimating lockdown induced European NO_2 changes, *Atmos. Chem. Phys.*, https://doi.org/10.5194/acp-21-7373-2021.

92. J. Barré, I. Aben, A. Agustí-Panareda, G. Balsamo, N. Bousserez, P. Dueben, R. Engelen, A. Inness, A. Lorente, J. McNorton, V.-H. Peuch, G. Radnoti AND R. Ribas, 2021: Systematic detection of local CH_4 emissions anomalies combining satellite measurements and high-resolution forecasts, *Atmos. Chem. Phys.*, 21, 5117–5136, https://doi.org/10.5194/acp-21-5117-2021.

91. F. Tummon, Alados Arboledas, L., Bonini, M., Guinot, B., Hicke, M., Jacob, C., Kendrovski, V., McCairns, W., Petermann, E., Peuch, V.-H., Pfaar, O., Sicard, M., Sikoparija, B. and Clot, B., 2021: The need for pan-European automatic pollen and fungal spore monitoring: a stakeholder workshop position paper, *Clin. Trans. Allergy*, 2021, 1–10, https://doi.org/10.1002/clt2.12015.

90. G. Shaddick, Salter, J., Peuch, V.-H., Ruggeri, G., Thomas, M. L., Mudu, P., Tarasova, O., Baklanov, A. and S. Gumy, 2021: Global air quality: an inter-disciplinary approach to exposure assessment and burden of disease, *Atmosphere*, 12, 48, https://doi.org/10.3390/atmos12010048.

89. M. Guevara, O. Jorba, A. Soret, H. Petetin, D. Bowdalo, K. Serradell, C. Tena, H. Denier van der Gon, J. Kuenen, V.-H. Peuch and C. Pérez García-Pando, 2021: Time-resolved emission reductions for atmospheric chemistry modelling in Europe during the COVID-19 lockdowns, *Atmos. Chem. Phys.*, 21, 773-797, https://doi.org/10.5194/acp-21-773-2021.

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88. S. Rémy, Z. Kipling, J. Flemming, O. Boucher, P. Nabat, M. Michou, A. Bozzo, M. Ades, V. Huijnen, A. Benedetti, R. Engelen, V.-H. Peuch, and J.-J. Morcrette, 2019: Description and evaluation of the tropospheric aerosol scheme in the Integrated Forecasting System (IFS-AER, cycle 45R1) of ECMWF, *Geosci. Model Dev.*, 12, 4627-4659, https://doi.org/10.5194/gmd-12-4627-2019.

87. A. Agustí-Panareda, M. Diamantakis, S. Massart, F. Chevallier, J. Muñoz-Sabater, J. Barré, R. Curcoll, R. Engelen, B. Langerock, R. Law, Z. Loh, J. A. Morguí, M. Parrington, V.-H. Peuch, M. Ramonet, C. Roehl, A. T. Vermeulen, T. Warneke and D. Wunch, 2019: Modelling CO_2 weather – why horizontal resolution matters, *Atmos. Chem. Phys.*, 19, 7347-7376, 2019 https://doi.org/10.5194/acp-19-7347-2019.

86. A. Inness, M. Ades, A. Agusti-Panareda, J. Barré, A. Benedictow, A.M. Blechschmidt, J. Dominguez, R. Engelen, H. J. Eskes, J. Flemming, V. Huijnen, L. Jones, Z. Kipling, S. Massart, M. Parrington, V.-H. Peuch, M. Razinger, S. Remy, M. Schulz and M. Suttie, 2019: The CAMS reanalysis of atmospheric composition, *Atmos. Chem. Phys.*, 19, 3515-3556, https://doi.org/10.5194/acp-19-3515-2019.

85. A. K. Petersen, G. P. Brasseur, I. Bouarar, J. Flemming, M. Gauss, F. Jiang, R. Kouznetsov, R. Kranenburg, B. Mijling, V.-H. Peuch, M. Pommier, A. Segers, M. Sofiev, R. Timmermans, R. Van der A, S. Walters, Y. Xie, J. Xu, and G. Zhou, 2019: Ensemble Forecasts of Air Quality in Eastern China Part 2. Evaluation of the MarcoPolo-Panda Prediction System, version 1, *Geosci. Model Dev.*, 12, 1241-1266, https://doi.org/10.5194/gmd-12-1241-2019.

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