CAMS global NRT system upgrade 45r1 (26 Jun 2018)

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New parameters in FTP dissemination

Mass density of air

At the moment almost all of the chemical and aerosol species we disseminate and archive are expressed as mass mixing ratios (kg kg-1). While this might be enough for most of the users, some would prefer to convert the data to mass concentration values (kg m-3).

The conversion formula is simple. We are now providing density of dry air ("den") as a new parameter in the CAMS main global dissemination stream (**CAMS_NREALTIME/ CAMS_GLOBAL**). The parameter is available on pressure and model levels in both GRIB and NetCDF format from the FTP server (ftp://dissemination.ecmwf.int).

The air density fields are not archived in the MARS data archive and are not available through Web API service.

The new files are named as follows:

```
z_cams_c_ecmf_20180425000000_prod_an_ml_000_den.grib
z_cams_c_ecmf_20180425000000_prod_an_ml_000_den.nc
z_cams_c_ecmf_20180425000000_prod_an_pl_000_den.grib
z_cams_c_ecmf_20180425000000_prod_an_pl_000_den.nc
...
z_cams_c_ecmf_20180425000000_prod_fc_ml_012_den.grib
z_cams_c_ecmf_20180425000000_prod_fc_ml_012_den.nc
z_cams_c_ecmf_20180425000000_prod_fc_pl_012_den.grib
z_cams_c_ecmf_20180425000000_prod_fc_pl_012_den.nc
...
```

Computation scripts

To compute mass concentration you can use the scripts below.

Compute mass concentration of a chemical species on pressure level from NetCDF output

compute_nc_concentration.sh

```
#!/bin/sh
module load cdo

DATADIR=/path-to-datadir
LEVEL=1000  # select pressure level
PARAM=co    # select parameter

# extract single level field
cdo -sellevel,${LEVEL} ${DATADIR}/z_cams_c_ecmf_20180425000000_prod_fc_pl_012_${PARAM}.nc ${PARAM}
_mmr_${LEVEL}.nc
cdo -sellevel,${LEVEL} ${DATADIR}/z_cams_c_ecmf_20180425000000_prod_fc_pl_012_den.nc den_${LEVEL}.nc

# unpack NetCDF data
cdo -b f32 copy ${PARAM}_mmr_${LEVEL}.nc ${PARAM}_mmr_${LEVEL}_32.nc
cdo -b f32 copy den_${LEVEL}.nc den_${LEVEL}_32.nc

# compute concentration = mmr * air_density
cdo mul ${PARAM}_mmr_${LEVEL}_32.nc den_${LEVEL}_32.nc ${PARAM}_conc_${LEVEL}.nc
```

Compute mass concentration of a chemical species on model level from GRIB file

compute_grib_concentration.sh

```
#!/bin/sh
module load eccodes
module load cdo

DATADIR=/path-to-datadir
LEVEL=60       # select model level
PARAM=no2      # select parameter

# extract single level field
grib_copy -w level=${LEVEL} ${DATADIR}/z_cams_c_ecmf_20180425000000_prod_fc_pl_012_${PARAM}.grib ${PARAM}
_mmr_${LEVEL}.grib
grib_copy -w level=${LEVEL} ${DATADIR}/z_cams_c_ecmf_20180425000000_prod_fc_pl_012_den.grib den_${LEVEL}.grib

# compute concentration = mmr * air_density
cdo mul ${PARAM}_mmr_${LEVEL}.grib den_${LEVEL}.grib ${PARAM}_conc_${LEVEL}.grib
```

New aerosol parameters in data archive

Several new aerosol diagnostic parameters are available from our MARS data archive using the Web API service. Please read the service description if you haven't used it before.

To access test data please use `dataset=cams_esuite` keyword. After the upgrade data will be available using keyword `dataset=cams_nrealtime`.

They are not distributed via the FTP server.

parameter group	list of parameters

Aerosol optical depth at additional wavelengths	**see all**
	`paramId, shortName, full name`
	`210217, aod340, Total aerosol optical depth at 340 nm`
	`210218, aod355, Total aerosol optical depth at 355 nm`
	`210219, aod380, Total aerosol optical depth at 380 nm`
	`210220, aod400, Total aerosol optical depth at 400 nm`
	`210221, aod440, Total aerosol optical depth at 440 nm`
	`210222, aod500, Total aerosol optical depth at 500 nm`
	`210223, aod532, Total aerosol optical depth at 532 nm`
	`210224, aod645, Total aerosol optical depth at 645 nm`
	`210225, aod800, Total aerosol optical depth at 800 nm`
	`210226, aod858, Total aerosol optical depth at 858 nm`
	`210227, aod1020, Total aerosol optical depth at 1020 nm`
	`210228, aod1064, Total aerosol optical depth at 1064 nm`
	`210229, aod1640, Total aerosol optical depth at 1640 nm`
	`210230, aod2130, Total aerosol optical depth at 2130 nm`

Absorption optical depth	**see all** paramId, shortName, full name 215096, aodabs340, Total absorption aerosol optical depth at 340 nm 215097, aodabs355, Total absorption aerosol optical depth at 355 nm 215098, aodabs380, Total absorption aerosol optical depth at 380 nm 215099, aodabs400, Total absorption aerosol optical depth at 400 nm 215100, aodabs440, Total absorption aerosol optical depth at 440 nm 215101, aodabs469, Total absorption aerosol optical depth at 469 nm 215102, aodabs500, Total absorption aerosol optical depth at 500 nm 215103, aodabs532, Total absorption aerosol optical depth at 532 nm 215104, aodabs550, Total absorption aerosol optical depth at 550 nm 215105, aodabs645, Total absorption aerosol optical depth at 645 nm 215106, aodabs670, Total absorption aerosol optical depth at 670 nm 215107, aodabs800, Total absorption aerosol optical depth at 800 nm 215108, aodabs858, Total absorption aerosol optical depth at 858 nm 215109, aodabs865, Total absorption aerosol optical depth at 865 nm 215110, aodabs1020, Total absorption aerosol optical depth at 1020 nm 215111, aodabs1064, Total absorption aerosol optical depth at 1064 nm 215112, aodabs1240, Total absorption aerosol optical depth at 1240 nm 215113, aodabs1640, Total absorption aerosol optical depth at 1640 nm 215176, aodabs2130, Total absorption aerosol optical depth at 2130 nm

Fine-mode optical depth	**see all** paramId, shortName, full name 215114, aodfm340, Total fine mode (r < 0.5 um) aerosol optical depth at 340 nm 215115, aodfm355, Total fine mode (r < 0.5 um) aerosol optical depth at 355 nm 215116, aodfm380, Total fine mode (r < 0.5 um) aerosol optical depth at 380 nm 215117, aodfm400, Total fine mode (r < 0.5 um) aerosol optical depth at 400 nm 215118, aodfm440, Total fine mode (r < 0.5 um) aerosol optical depth at 440 nm 215119, aodfm469, Total fine mode (r < 0.5 um) aerosol optical depth at 469 nm 215120, aodfm500, Total fine mode (r < 0.5 um) aerosol optical depth at 500 nm 215121, aodfm532, Total fine mode (r < 0.5 um) aerosol optical depth at 532 nm 215122, aodfm550, Total fine mode (r < 0.5 um) aerosol optical depth at 550 nm 215123, aodfm645, Total fine mode (r < 0.5 um) aerosol optical depth at 645 nm 215124, aodfm670, Total fine mode (r < 0.5 um) aerosol optical depth at 670 nm 215125, aodfm800, Total fine mode (r < 0.5 um) aerosol optical depth at 800 nm 215126, aodfm858, Total fine mode (r < 0.5 um) aerosol optical depth at 858 nm 215127, aodfm865, Total fine mode (r < 0.5 um) aerosol optical depth at 865 nm 215128, aodfm1020, Total fine mode (r < 0.5 um) aerosol optical depth at 1020 nm 215129, aodfm1064, Total fine mode (r < 0.5 um) aerosol optical depth at 1064 nm 215130, aodfm1240, Total fine mode (r < 0.5 um) aerosol optical depth at 1240 nm 215131, aodfm1640, Total fine mode (r < 0.5 um) aerosol optical depth at 1640 nm 215177, aodfm2130, Total fine mode (r < 0.5 um) aerosol optical depth at 2130 nm
Column-mean single scattering albedo	**see all** paramId, shortName, full name 215132, ssa340, Single scattering albedo at 340 nm 215133, ssa355, Single scattering albedo at 355 nm 215134, ssa380, Single scattering albedo at 380 nm 215135, ssa400, Single scattering albedo at 400 nm 215136, ssa440, Single scattering albedo at 440 nm 215137, ssa469, Single scattering albedo at 469 nm 215138, ssa500, Single scattering albedo at 500 nm 215139, ssa532, Single scattering albedo at 532 nm 215140, ssa550, Single scattering albedo at 550 nm 215141, ssa645, Single scattering albedo at 645 nm 215142, ssa670, Single scattering albedo at 670 nm 215143, ssa800, Single scattering albedo at 800 nm 215144, ssa858, Single scattering albedo at 858 nm 215145, ssa865, Single scattering albedo at 865 nm 215146, ssa1020, Single scattering albedo at 1020 nm 215147, ssa1064, Single scattering albedo at 1064 nm 215148, ssa1240, Single scattering albedo at 1240 nm 215149, ssa1640, Single scattering albedo at 1640 nm 215178, ssa2130, Single scattering albedo at 2130 nm

Column-mean asymmetry parameter	**see all** paramId, shortName, full name 215150, asymmetry340, asymmetry factor at 340 nm 215151, asymmetry355, asymmetry factor at 355 nm 215152, asymmetry380, asymmetry factor at 380 nm 215153, asymmetry400, asymmetry factor at 400 nm 215154, asymmetry440, asymmetry factor at 440 nm 215155, asymmetry469, asymmetry factor at 469 nm 215156, asymmetry500, asymmetry factor at 500 nm 215157, asymmetry532, asymmetry factor at 532 nm 215158, asymmetry550, asymmetry factor at 550 nm 215159, asymmetry645, asymmetry factor at 645 nm 215160, asymmetry670, asymmetry factor at 670 nm 215161, asymmetry800, asymmetry factor at 800 nm 215162, asymmetry858, asymmetry factor at 858 nm 215163, asymmetry865, asymmetry factor at 865 nm 215164, asymmetry1020, asymmetry factor at 1020 nm 215165, asymmetry1064, asymmetry factor at 1064 nm 215166, asymmetry1240, asymmetry factor at 1240 nm 215167, asymmetry1640, asymmetry factor at 1640 nm 215179, asymmetry2130, asymmetry factor at 2130 nm
Per-bin aerosol optical depth at 550 nm	**see all** paramId, shortName, full name 215022, aerodsss, Sea salt aerosol (0.03 - 0.5 um) optical depth 215023, aerodssm, Sea salt aerosol (0.5 - 5 um) optical depth 215024, aerodssl, Sea salt aerosol (5 - 20 um) optical depth 215046, aeroddus, Dust aerosol (0.03 - 0.55 um) optical depth 215047, aeroddum, Dust aerosol (0.55 - 9 um) optical depth 215048, aeroddul, Dust aerosol (9 - 20 um) optical depth 215063, aerodomhphob, Hydrophobic organic matter aerosol optical depth 215064, aerodomhphil, Hydrophilic organic matter aerosol optical depth 215079, aerodbchphob, Hydrophobic black carbon aerosol optical depth 215080, aerodbchphil, Hydrophilic black carbon aerosol optical depth 215088, aerodsu, Sulphate aerosol optical depth
Aerosol mass budget terms	**see all** paramId, shortName, full name 215001, aersrcsss, Source/gain of sea salt aerosol (0.03 - 0.5 um) 215002, aersrcssm, Source/gain of sea salt aerosol (0.5 - 5 um) 215003, aersrcssl, Source/gain of sea salt aerosol (5 - 20 um) 215004, aerddpsss, Dry deposition of sea salt aerosol (0.03 - 0.5 um) 215005, aerddpssm, Dry deposition of sea salt aerosol (0.5 - 5 um) 215006, aerddpssl, Dry deposition of sea salt aerosol (5 - 20 um) 215007, aersdmsss, Sedimentation of sea salt aerosol (0.03 - 0.5 um) 215008, aersdmssm, Sedimentation of sea salt aerosol (0.5 - 5 um) 215009, aersdmssl, Sedimentation of sea salt aerosol (5 - 20 um) 215010, aerwdlssss, Wet deposition of sea salt aerosol (0.03 - 0.5 um) by large-scale precipitation 215011, aerwdlsssm, Wet deposition of sea salt aerosol (0.5 - 5 um) by large-scale precipitation 215012, aerwdlsssl, Wet deposition of sea salt aerosol (5 - 20 um) by large-scale precipitation 215013, aerwdccsss, Wet deposition of sea salt aerosol (0.03 - 0.5

um) by convective precipitation
215014, aerwdccssm, Wet deposition of sea salt aerosol (0.5 - 5 um) by convective precipitation
215015, aerwdccssl, Wet deposition of sea salt aerosol (5 - 20 um) by convective precipitation
215016, aerngtsss, Negative fixer of sea salt aerosol (0.03 - 0.5 um)
215017, aerngtssm, Negative fixer of sea salt aerosol (0.5 - 5 um)
215018, aerngtssl, Negative fixer of sea salt aerosol (5 - 20 um)
215025, aersrcdus, Source/gain of dust aerosol (0.03 - 0.55 um)
215026, aersrcdum, Source/gain of dust aerosol (0.55 - 9 um)
215027, aersrcdul, Source/gain of dust aerosol (9 - 20 um)
215028, aerddpdus, Dry deposition of dust aerosol (0.03 - 0.55 um)
215029, aerddpdum, Dry deposition of dust aerosol (0.55 - 9 um)
215030, aerddpdul, Dry deposition of dust aerosol (9 - 20 um)
215031, aersdmdus, Sedimentation of dust aerosol (0.03 - 0.55 um)
215032, aersdmdum, Sedimentation of dust aerosol (0.55 - 9 um)
215033, aersdmdul, Sedimentation of dust aerosol (9 - 20 um)
215034, aerwdlsdus, Wet deposition of dust aerosol (0.03 - 0.55 um) by large-scale precipitation
215035, aerwdlsdum, Wet deposition of dust aerosol (0.55 - 9 um) by large-scale precipitation
215036, aerwdlsdul, Wet deposition of dust aerosol (9 - 20 um) by large-scale precipitation
215037, aerwdccdus, Wet deposition of dust aerosol (0.03 - 0.55 um) by convective precipitation
215038, aerwdccdum, Wet deposition of dust aerosol (0.55 - 9 um) by convective precipitation
215039, aerwdccdul, Wet deposition of dust aerosol (9 - 20 um) by convective precipitation
215040, aerngtdus, Negative fixer of dust aerosol (0.03 - 0.55 um)
215041, aerngtdum, Negative fixer of dust aerosol (0.55 - 9 um)
215042, aerngtdul, Negative fixer of dust aerosol (9 - 20 um)
215049, aersrcomhphob, Source/gain of hydrophobic organic matter aerosol
215050, aersrcomhphil, Source/gain of hydrophilic organic matter aerosol
215051, aerddpomhphob, Dry deposition of hydrophobic organic matter aerosol
215052, aerddpomhphil, Dry deposition of hydrophilic organic matter aerosol
215053, aersdmomhphob, Sedimentation of hydrophobic organic matter aerosol
215054, aersdmomhphil, Sedimentation of hydrophilic organic matter aerosol
215055, aerwdlsomhphob, Wet deposition of hydrophobic organic matter aerosol by large-scale precipitation
215056, aerwdlsomhphil, Wet deposition of hydrophilic organic matter aerosol by large-scale precipitation
215057, aerwdccomhphob, Wet deposition of hydrophobic organic matter aerosol by convective precipitation
215058, aerwdccomhphil, Wet deposition of hydrophilic organic matter aerosol by convective precipitation
215059, aerngtomhphob, Negative fixer of hydrophobic organic matter aerosol
215060, aerngtomhphil, Negative fixer of hydrophilic organic matter aerosol
215065, aersrcbchphob, Source/gain of hydrophobic black carbon aerosol
215066, aersrcbchphil, Source/gain of hydrophilic black carbon aerosol
215067, aerddpbchphob, Dry deposition of hydrophobic black carbon aerosol
215068, aerddpbchphil, Dry deposition of hydrophilic black carbon aerosol
215069, aersdmbchphob, Sedimentation of hydrophobic black carbon aerosol
215070, aersdmbchphil, Sedimentation of hydrophilic black carbon aerosol
215071, aerwdlsbchphob, Wet deposition of hydrophobic black carbon aerosol by large-scale precipitation

	215072, aerwdlsbchphil, Wet deposition of hydrophilic black carbon aerosol by large-scale precipitation 215073, aerwdccbchphob, Wet deposition of hydrophobic black carbon aerosol by convective precipitation 215074, aerwdccbchphil, Wet deposition of hydrophilic black carbon aerosol by convective precipitation 215075, aerngtbchphob, Negative fixer of hydrophobic black carbon aerosol 215076, aerngtbchphil, Negative fixer of hydrophilic black carbon aerosol 215081, aersrcsu, Source/gain of sulphate aerosol 215082, aerddpsu, Dry deposition of sulphate aerosol 215083, aersdmsu, Sedimentation of sulphate aerosol 215084, aerwdlssu, Wet deposition of sulphate aerosol by large-scale precipitation 215085, aerwdccsu, Wet deposition of sulphate aerosol by convective precipitation 215086, aerngtsu, Negative fixer of sulphate aerosol 215168, aersrcso2, Source/gain of sulphur dioxide 215169, aerddpso2, Dry deposition of sulphur dioxide 215170, aersdmso2, Sedimentation of sulphur dioxide 215171, aerwdlsso2, Wet deposition of sulphur dioxide by large-scale precipitation 215172, aerwdccso2, Wet deposition of sulphur dioxide by convective precipitation 215173, aerngtso2, Negative fixer of sulphur dioxide
Model-level fields (aerext* and aerbackscat* are also available on pressure levels; aot* are not)	**see all** paramId, shortName, full name 215093, aot532, Total aerosol optical thickness at 532 nm 215094, naot532, Natural (sea-salt and dust) aerosol optical thickness at 532 nm 215095, aaot532, Antropogenic (black carbon, organic matter, sulphate) aerosol optical thickness at 532 nm 215180, aerext355, Aerosol extinction coefficient at 355 nm 215181, aerext532, Aerosol extinction coefficient at 532 nm 215182, aerext1064, Aerosol extinction coefficient at 1064 nm 215183, aerbackscattoa355, Aerosol backscatter coefficient at 355 nm (from top of atmosphere) 215184, aerbackscattoa532, Aerosol backscatter coefficient at 532 nm (from top of atmosphere) 215185, aerbackscattoa1064, Aerosol backscatter coefficient at 1064 nm (from top of atmosphere) 215186, aerbackscatgnd355, Aerosol backscatter coefficient at 355 nm (from ground) 215187, aerbackscatgnd532, Aerosol backscatter coefficient at 532 nm (from ground) 215188, aerbackscatgnd1064, Aerosol backscatter coefficient at 1064 nm (from ground)

A new near-surface service

To reduce the volume of data one would have to download to access near-surface values we are introducing a new data service. We are making the **lo west model level** analyses and forecasts of atmospheric composition parameters available as **separate files**. The fields are based on same CAMS global modelling system.

In the new file names level type information is encoded as **ml60**, the files can be found in the directory called **CAMS_GLOBAL_ADDITIONAL**:

```
/DATA/CAMS_GLOBAL_ADDITIONAL/2018042500/z_cams_c_ecmf_20180425000000_prod_an_ml60_000_aermr01.grib
/DATA/CAMS_GLOBAL_ADDITIONAL/2018042500/z_cams_c_ecmf_20180425000000_prod_an_ml60_000_aermr01.nc
...
```