

History of Changes

Version 2.12.0 (February 2019)

Contributions

Thanks to Daniel Tipping from [OldReliableTech](#) for the Windows support and conda setup

New Features/Improvements

- [ECC-853] - Install tigde tools only if ECCODES_INSTALL_EXTRA_TOOLS is set
The tools tigde_name, tigde_accumulations and tigde_split are no longer installed by default
- [ECC-862] - GRIB2: The 'tablesVersion' key should default to the latest operational WMO version
When converting from GRIB1 to GRIB2, the "tablesVersion" key is now the latest WMO (was previously 5)
- [ECC-868] - Provide key to control whether large constant fields are produced
The key "override_large_constant_fields" has been removed and replaced by "produceLargeConstantFields"
- [ECC-830] - BUFR encoding: set to missing if value out of range (key)
- [ECC-860] - GRIB2: Add support for atmospheric chemical product definition templates
- [ECC-713] - grib_to_netcdf: Wrong time steps when stepUnits not in hours
- [ECC-837] - BUFR Tables: non-ASCII characters
- [ECC-838] - New probability T850 standardized anomalies with respect to standard deviation
- [ECC-854] - MARS: add soil level and layer with correct mapping for mars 'level'
- [ECC-861] - GRIB2: The 'time' namespace not defined for product definition templates 55 and 59
- [ECC-870] - Add Clear air turbulence (CAT) and Mountain wave turbulence
- [ECC-876] - Add 200-metre U and V wind components and modify 10 and 100-metre related parameters
- [ECC-877] - Create new S2S ocean parameter Mean sea water temperature in upper 300 m
- [ECC-878] - Add wave parameters for cy46r1
- [ECC-711] - Add keys packingError and unpackedError in template 7.42
- [ECC-851] - Refactoring: duplicated tigde 'scan' function
- [ECC-857] - GRIB2: stepType undefined for typeOfStatisticalProcessing 8, 10 and 11
- [ECC-859] - GRIB2 templates for chemicals should use forecastTime and not startStep
- [ECC-863] - GRIB2: Additional keys for gridType=lambert_azimuthal_equal_area
- [ECC-864] - Improved name for the angularPrecision key
- [ECC-883] - grib_ls -B: does not issue error if sort keyword is wrong
- [ECC-884] - Visual Studio solution: upgrade to VS 2017

Bug Fixes

- [ECC-744] - Defining master and local table version in GRIB2
- [ECC-834] - Chemicals: using local definition 36 causes grib2 parameters to become unknown
- [ECC-856] - BUFR - length of string attribute not correct if used with subset section
- [ECC-866] - Python3: codes_gts_new_from_file does not return all GTS bulletins
- [ECC-872] - Step should be set to endStep, not startStep, in stream wamd, type=fc.
- [ECC-873] - grib_ls with sorting: The 'count' key is wrong
- [ECC-875] - bufr_copy -g not implemented
- [ECC-880] - grib_to_netcdf calculates the time wrongly for forecast data files from [opendata.dwd.de](#)

Version 2.10.0 (December 2018)

Contributions

- [ECC-769] - Imaginary part of first spectral coefficients is not zero when decoding a spectral field

New Features/Improvements

- [ECC-264] - Support for Python 3
We now have a **beta version** of the Python 3 interface. Although we tried to minimise the impact to users some changes to the client code will be necessary.
When opening BUFR or GRIB files, please ensure this happens in binary mode, as follows:

```
f = open("fields.grib", "rb") # Reading  
f = open("output.bufr", "wb") # Writing
```


Please test the Python 3 support carefully and provide us with feedback. We appreciate your co-operation.
- [ECC-763] - Break tests into two sets, one that includes its data files in the distribution and another "extended" that downloads them
The default set of tests no longer requires any data to be downloaded and takes less time than before. Users who wish to run extensive tests (which require downloads) should configure the build as follows:

```
cmake /path/to/src -DENABLE_EXTRA_TESTS=ON ...
```


These extra tests should be run if users plan to change the code e.g. for contributions.
We are aware that many maintainers/packagers of ecCodes did not run any tests to avoid the downloads. **Please enable the tests** again, they are vital to ensure ecCodes has been installed properly.
- [ECC-602] - Add parameters for Standardised Precipitation index (seasonal fc)

- [ECC-775] - BUFR decode performance: check skipExtraKeyAttributes just once
- [ECC-809] - grib_get_data: add -s option to set keys
- [ECC-771] - Update BUFR tables with the latest WMO version 31.0.0
- [ECC-278] - grib_ls -n namespace fails if namespace contains an array-type key
- [ECC-751] - Add new grib.efcl.[type].def for EFAS climatology
- [ECC-759] - DWD local Tables: GRIB and BUFR
- [ECC-761] - Add probability parameters to comply with new GDPFS Manual
- [ECC-828] - 172144 and 172189 - short name is undefined
- [ECC-772] - Polar stereographic: keys 'latitudes' and 'longitudes' not defined
- [ECC-776] - Python examples: Use 'open' with binary mode
- [ECC-777] - Compiling with gcc and -std=c99 fails
- [ECC-808] - Offer a way for grib_get_data and iterators not to unrotate rotated grids

Bug fixes

- [ECC-767] - grib_dump -j produces invalid JSON when a file has multiple messages
- [ECC-356] - bufr_dump: ident is not shown
- [ECC-758] - GRIB1: grib_dump -j crashes
- [ECC-764] - Description of parameters aermr07diff, aermr08diff and aermr09diff seems to be wrong, with interchanged "Hydrophilic" and "Hydrophobic"
- [ECC-768] - Reduced Gaussian grid: grib_get_reduced_row() not working for particular field
- [ECC-774] - Change packingType: error message issued despite success

Version 2.9.2 (November 2018)

- [ECC-756] - Reduced Gaussian grids in GRIB1: Do not set section1Flags
- [ECC-761] - Add probability parameters to comply with new GDPFS Manual

Version 2.9.0 (September 2018)

New Features/Improvements

Performance enhancements

- [ECC-710] - BUFR decode performance: JSON bufr_dump much slower than plain mode
- [ECC-741] - BUFR decode performance: add option to exclude some attributes
A new key has been added: skipExtraKeyAttributes.
Set this to 1 (BEFORE the unpack) and you should notice a 20% improvement in the decoding speed
- [ECC-734] - BUFR decode performance: keys iterator stores all key names
- [ECC-745] - bufr_compare performance: speed up by skipping extra key attributes
- [ECC-708] - grib_dump performance: WMO option unpacks unnecessarily
- [ECC-742] - BUFR: Remove unused key 'BUFRstr'
- [ECC-706] - bufr_dump: add -X option to specify the offset in the input file
- [ECC-737] - bufr_copy/grib_copy: add -X option to specify the offset in the input file
- [ECC-723] - bufr_dump: option '-f' should dump header if unpack fails
- [ECC-690] - New Satellite Winds BUFR Sequence for GOES16 - AMVs
- [ECC-701] - EFAS: Latest MARS implementation
- [ECC-712] - Update definitions of ocean parameters
- [ECC-721] - Create a new MARS class for running CAMS Research experiments
- [ECC-722] - Add extra MARS streams for EFAS
- [ECC-728] - update standard_name (cfName) of ocean parameters
- [ECC-746] - Testing: Allow test executables to be run with valgrind
- [ECC-724] - GRIB Parameters: create GRIB2 definitions for table 210 (Wildfire flux)
- [ECC-725] - grib_to_netcdf: Does not preserve MARS type
- [ECC-703] - ecCodes BUFR local tables don't work for masterTablesVersionNumber 19
- [ECC-739] - BUFR encoding: issue better error messages when values out of range
- [ECC-740] - bufr_dump -D/-E python: make output Python3 compatible
- [ECC-730] - Harmonise capitalisation of names in the parameter database for MARS types

Bug Fixes

- [ECC-445] - Error numberOfPoints != size(values) on reading specific reduced_gg with sub-area
- [ECC-644] - Compilation of python bindings with the C PGI compiler
- [ECC-696] - Valgrind error: grib_get_data on reduced gaussian sub-area
- [ECC-697] - GRIB parameters: change shortName of 171170 (should be stal2)
- [ECC-704] - Wrong latitude values returned for sub-area
- [ECC-716] - Segmentation fault: bufr_filter on synop
- [ECC-717] - BUFR: behaviour of ECCODES_BUFR_SET_TO_MISSING_IF_OUT_OF_RANGE
- [ECC-727] - ecCodes should be able to handle all versions of HDF5 Super Block
- [ECC-729] - NetCDF standard name: 'air_pressure_at_sea_level' is deprecated
- [ECC-735] - gts_ls memory fault
- [ECC-736] - bufr_count -f: hangs on invalid input
- [ECC-738] - bufr_dump fails when memfs is on

- [ECC-748] - grib_get/bufr_get: infinite loop when a directory is passed in
- [ECC-750] - BUFR encoding: maximum allowed value
- [ECC-754] - grib_to_netcdf unit for time does not comply to ISO8601
- [ECC-755] - Change to VERSION #defines breaks client C programs

Version 2.8.2 (August 2018)

- [ECC-701] - EFAS: Latest MARS implementation
- [ECC-712] - Update definitions of ocean parameters
- [ECC-721] - Create a new MARS class for running CAMS Research experiments
- [ECC-722] - Add extra MARS streams for EFAS
- [ECC-724] - GRIB Parameters: create GRIB2 definitions for table 210 (Wildfire flux)
- [ECC-445] - Error numberOfPoints != size(values) on reading specific reduced_gg with sub-area
- [ECC-576] - Sub-area of Gaussian grids fails to encode bounding box
- [ECC-727] - ecCodes should be able to handle all versions of HDF5 Super Block

Version 2.8.0 (June 2018)

New Features/Improvements

Performance enhancements

- [ECC-638] - grib_ls/grib_get -l using mask: nearest neighbour performance
- [ECC-668] - BUFR decode performance: high replication counts
- [ECC-689] - GRIB decode performance: remove redundant keys from GRIB2 messages
- [ECC-667] - BUFR decode performance: Operator 203YYY: override table keeps growing
- [ECC-687] - Update GRIB2 definitions with the latest WMO V21.0.0 code tables/templates
- [ECC-691] - Update BUFR tables with the latest WMO version 30
- [ECC-616] - BUFR: Cannot extract subsets when operator 203YYY is present
- [ECC-651] - grib_compare/bufr_compare: Enable a 'two-way' switch for symmetric comparison
- [ECC-658] - bufr_compare: apply relative comparison (-R) to all ranks of a given key
- [ECC-625] - Encoding of La1/La2/Lo1/Lo2 should 'snap out' domain edges for sub-areas.
- [ECC-636] - filter rules: allow printing of array data all on one line
- [ECC-637] - bufr_dump -p should show descriptors in the WMO F-X-Y format
- [ECC-646] - Harmonise names of MARS CLASSES between the paramDB, Apps Catalogues and MARS
- [ECC-654] - Change the name and shortName for parameter 217004 (Methane)
- [ECC-655] - Lightning parameters: provide GRIB2 representation
- [ECC-662] - Add extra keys in the EFAS local definition to store info on analysis and fillup
- [ECC-664] - GRIB: Change the units of the emission parameters (table 219)
- [ECC-672] - Use WMO codes for new lightning parameters
- [ECC-679] - Add numberOfForecastsInEnsemble to the GRIB1 Local Definition number 16
- [ECC-682] - Change the name of averaged lightning parameters
- [ECC-684] - GRIB: Remove shortNames 'ocu' and 'ocv' from parameters 150133 and 150134
- [ECC-690] - New Satellite Winds BUFR Sequence for GOES16 - AMVs
- [ECC-692] - GRIB parameters: change name and shortName of aerosols (table 215)
- [ECC-652] - New parameters for CAMS chemistry schemes: new species (table 217)
- [ECC-659] - New parameters for CAMS chemistry schemes: species total column (table 218)
- [ECC-660] - New parameters for CAMS chemistry schemes: Emissions and Wildfire flux (table 219)
- [ECC-661] - New parameters for CAMS chemistry schemes: Dry deposition velocity (table 221)
- [ECC-674] - Examples: typo in bufr_read_scatterometer.f90
- [ECC-675] - Examples: confusing comment in bufr_expanded.f90

Bug Fixes

- [ECC-693] - grib_to_netcdf: fails with UKMO GRIB (fields are not considered distinct)
- [ECC-685] - grib_to_netcdf: fails with GRIB message with almost constant values
- [ECC-694] - grib_to_netcdf: fails compilation with NetCDF version 3
- [ECC-431] - bufr_compare: succeeds for BUFR files which are different
- [ECC-568] - Different behaviour between bufr keys iterator and bufr dump
- [ECC-640] - grib_ls -B crashes with non-existent input file
- [ECC-645] - CRASH: BUFR encoding: setting a string key with integer value
- [ECC-695] - BUFR encoding: Incorrect error message when value out of range
- [ECC-648] - grib_filter: Cannot set codetable key to an array
- [ECC-649] - Valgrind error: statistics for a field with all missing values
- [ECC-650] - bufr_filter: outputs non-printable characters if string key is MISSING
- [ECC-653] - Three files still have the GPL licence notice
- [ECC-656] - bufr_compare: using relative comparison (-R) with 'all' does not work
- [ECC-657] - grib_copy behaviour of -p -P -v options / manual
- [ECC-677] - Delayed description replication factors not available (from bufr_dump -Dfortran)
- [ECC-686] - BUFR: Changing the subtype in the local section has effect on other keys

Version 2.7.3 (April 2018)

- [ECC-672] - Use WMO codes for new lightning parameters
These are lightning flash density parameters output by the model in IFS cycle 45r1
- [ECC-625] - Encoding of La1/La2/Lo1/Lo2 should 'snap out' domain edges for sub-areas

Version 2.7.0 (February 2018)

Contributions

- [ECC-463] - Encoding of spherical harmonics sub-truncation using IEEE-64

New Features/Improvements

- [ECC-407] - Add option to bufr_count/grib_count to count valid messages
- [ECC-341] - implement area extraction in bufr_filter for uncompressed data
- [ECC-629] - grib_ls and grib_count to read standard input instead of a filename
- [ECC-394] - bufr_dump -E option: include keys whose values are MISSING
- [ECC-607] - BUFR decode performance: remove redundant calls to reset_deeper_qualifiers
- [ECC-608] - bufr_descriptor struct: reference type should be 'long' (not 'double')
- [ECC-611] - BUFR Encoding: channelNumber reset to 0
- [ECC-602] - Add parameters for Standardised Precipitation index (seasonal fc)
- [ECC-612] - New parameters for Global Fire Assimilation System (GFAS)
- [ECC-570] - Wave forecast verification: add support for LC-WFV
- [ECC-562] - EFAS: Create GRIB2 local definition for EFAS data
- [ECC-563] - EFAS: Add two parameters for total precipitation in the last 6 and 24 hrs
- [ECC-641] - new BUFR key for Continuous Data Assimilation

Bug Fixes

- [ECC-359] - CRASH: set 'pack' to 1 on new bufr handle
- [ECC-597] - "grib_dump -D" returns "wrong size" errors on grid_second_order
- [ECC-603] - Decoding of ERS (BUFR edition 2) data
- [ECC-610] - isOctahedral does not work for non-global gaussian grids with specific areas
- [ECC-614] - BUFR: problem with datetime extraction
- [ECC-627] - grib_to_netcdf: fails with less user-friendly error message on non-regular grid
- [ECC-634] - bufr_dump -p: does not list string keys with MISSING value
- [ECC-635] - bufr_dump (JSON): should show missing value of string key as 'null'
- [ECC-609] - ecCodes requires python 2.7 to run all the tests but the minimum required version is 2.6
- [ECC-615] - ECMWF Installation: build with OpenJPEG v2.3 on all platforms
- [ECC-617] - BUFR: add WMO version 2 tables from BUFRDC to ecCodes
- [ECC-618] - BUFR: add WMO version=2 local version=1 tables from BUFRDC to ecCodes
- [ECC-624] - centre CMCC for mars
- [ECC-626] - BUFR local tables for processing MWSH and IRAS of FY-3 VASS products
- [ECC-628] - BUFR local sequence for EUMETSAT AMSR-2 data
- [ECC-631] - Assign centre abbreviation for 204 (NIWA)

Version 2.6.0 (December 2017)

New Features/Improvements

- [ECC-567] - codes_split_file tool
A new tool has been added. It splits an input file (GRIB, BUFR etc) into chunks of roughly the same size. The output files are named input_01, input_02 etc. This is much faster than grib_copy/bufr_copy.
- [ECC-592] - Update BUFR tables with the latest WMO version 29
Note: Some keys have been renamed as a result of this change:

New name (from version 29)	Old name
verticalSoundingProductQualifier	tovsOrAtovsProductQualifier
bandwidthCorrectionCoefficient1	bandwidthCorrectionCoefficient1ForAtovs
bandwidthCorrectionCoefficient2	bandwidthCorrectionCoefficient2ForAtovs

- [ECC-584] - Update GRIB2 definitions with the latest WMO V20.0.0 code tables/templates
- [ECC-549] - Create MARS stream for GRIB EFAS data
- [ECC-555] - Add verificationYear, monthlyVerificationYear, verificationMonth, monthlyVerificationMonth for monthly streams
- [ECC-477] - Redundant error message changing packing from CCSDS to grid_simple
- [ECC-547] - Add WMO definition to 2 wave parameters and rename them
- [ECC-571] - DWD: corrections to edzw local definitions (newer)
- [ECC-574] - Update MARS stream descriptions for esmm and ehmm
- [ECC-575] - Add new GRIB fields for lightning
- [ECC-577] - Add localYear, localMonth, localDay, localHour, localMinute and localSecond to bufr_dump
- [ECC-578] - Long names of GRIB parameters 210007-210010 (aermr07-10) are incorrect
- [ECC-580] - Change of parameter name and units: 210064 and 210065

- [ECC-581] - Tables 172 and 173: rename parameters and assign shortnames
- [ECC-583] - Two new parameters: Water Vapour Flux and Water Vapour Flux Index
- [ECC-585] - Add parameter for 'Fraction of snow cover' with units 'Proportion'

Bug Fixes

- [ECC-594] - Assertion failed: `ktype == GRIB_TYPE_LONG' in src/grib_expression_class_funcion.c
- [ECC-596] - Memory leak: grib_accessor_class_md5.c
- [ECC-538] - ecCodes does not honour ECCODES_NO_ABORT
- [ECC-550] - Segmentation violation when setting descriptor 236000
- [ECC-551] - Standard deviation is shown as NAN
- [ECC-556] - BUFR: 'typicalDate' calculation should cater for invalid year in BUFR4
- [ECC-557] - class="l5": set mars.step=endStep for streams mnth/edmm/wamo/ewmm
- [ECC-558] - Windows - linker error: unresolved external symbol _grib_dumper_class_buf_r_simple
- [ECC-579] - BUFR nested replication problem
- [ECC-582] - bufr_dump -Efortran creates BUFR which differs from input (string value)
- [ECC-586] - CRASH: extracting nonexistent BUFR subset with doExtractSubsets
- [ECC-589] - Clang ThreadSanitizer error: data race on 'bits_all_one'
- [ECC-590] - Clang ThreadSanitizer error: data race on expanded_descriptor_list_push

Version 2.5.0 (October 2017)

Contributions

- [ECC-518] - grib_to_netcdf: support deflate option for netCDF-4 output formats
Thanks to Antonio S. Cofino Gonzalez.
New options provided for grib_to_netcdf to support deflate and shuffle options for netCDF-4 output formats.

New Features/Improvements

- [ECC-419] - Simple bufr_dump
A "-p" option is provided for bufr_dump to allow a "plain" mode dump, just listing key=value
- [ECC-533] - Implement grib_find_nearest() for Polar Stereographic grid_type
- [ECC-476] - Add new function codes_count_in_filename which takes a path
- [ECC-504] - New runoff parameters for system 5 seasonal forecast
- [ECC-534] - Add two parameters for river discharge in the last 6 and 24 hrs
- [ECC-537] - Update the local concepts for DWD (2017.09)
- [ECC-548] - Add GRIB2 Product Definition Templates 4.67 and 4.68
- [ECC-443] - netcdf4 compression with grib_to_netcdf
- [ECC-485] - Add support for non-integer size for the 'codetable' statement
- [ECC-505] - Add BUFR local descriptors from EUMETSAT
- [ECC-509] - Add option to skip install of fortran modules
- [ECC-468] - tables seem to be installed as files instead of symbolic links
- [ECC-500] - Performance: grib2: grib_ls using local parameter takes longer than WMO parameter
- [ECC-508] - Add option to not install grib definitions and samples
- [ECC-510] - Add new MARS class for ERA5 land surface parameters
- [ECC-526] - typeOfLevel key should include typeOfFirstFixedSurface == 10 (Entire atmosphere)
- [ECC-528] - Add wmo_read_any_from_stream_malloc()
- [ECC-540] - When using MEMFS the default should be not to install samples and definitions

Bug Fixes

- [ECC-532] - Problems with bufr_dump: taking all available memory
- [ECC-435] - CRASH: Python keys iterator on GRIB message
- [ECC-473] - isOctahedral does not work for non-global gaussian grids
- [ECC-478] - Scaling values using grib_set ignores values=9999. when bitmapPresent=0
- [ECC-480] - grib_filter slower on large GRIB file compared with grib_api
- [ECC-490] - GRIB-API -> ecCodes F90 migration issue
- [ECC-492] - bufr_dump problems for extracted Aeolus BUFR file
- [ECC-501] - GRIB2 encoding: longitude values should be 0 to 360
- [ECC-503] - Fortran interface: status argument of keys_iterator_next should not be optional
- [ECC-511] - Invalid data read from FRET grib2 files with grid_complex_spatial_differencing packing
- [ECC-515] - CRASH: reading very large GRIB1 message
- [ECC-517] - crash/error setting inputExtendedDelayedDescriptorReplicationFactor greater than 486
- [ECC-521] - grib_get_data for Lambert Conformal: incorrect if adjacent rows scan in the opposite directions
- [ECC-522] - Lat/Lon iterator gives wrong result for some scanning and organisation modes
- [ECC-524] - grib_iterator behaves strangely for lambert representation
- [ECC-529] - grib_get_data for polar stereographic gets wrong lat and long
- [ECC-535] - Workaround for internal compiler error in memfs.c on Cray
- [ECC-542] - Enabling memfs searches for Python include dir
- [ECC-545] - Assertion failure retrieving grib key

Version 2.4.1 (August 2017)

- [ECC-511] - Invalid data read from FRET grib2 files with grid_complex_spatial_differencing packing
- [ECC-478] - Scaling values using grib_set ignores values=9999. when bitmapPresent=0
- [ECC-514] - CMath library is added as a source file
- [ECC-509] - Add option to skip install of fortran modules
- [ECC-345] - "make install" should allow not to install definitions files and samples when MEMFS is on
- [ECC-508] - Add option to not install grib definitions and samples
- [ECC-510] - Add new MARS class for ERA5 land surface parameters

Version 2.4.0 (July 2017)

New Features/Improvements

- [ECC-287] - Support for GRIB3 (experimental)

This is an initial prototype GRIB edition 3 decoder/encoder to accelerate development of the standard to be proposed to WMO.
At this point this implementation is **entirely experimental** and can change in future releases.
It is provided here to solicit feedback.

- [ECC-470] - BUFR: iasi encoding performance
- [ECC-482] - datetime comparison in bufr_filter
- [ECC-484] - Implement logical AND specialised expression
- [ECC-486] - Implement logical OR specialised expression
- [ECC-487] - Add parameter for '2 metre relative humidity with respect to water'
- [ECC-488] - Add GRIB1 representation for parameter 260048 (total precipitation rate)
- [ECC-496] - Request for a modification of the naming of the new lightning GRIB fields
- [ECC-497] - New GRIB parameters needed for system 5 seasonal forecast
- [ECC-420] - CPU time of BUFR unpacking increased significantly in 2.1.0
- [ECC-483] - Add mars key 'system' for class 'c3'
- [ECC-481] - extended BUFR rdbSubtype
- [ECC-493] - Saral altika data using a wrong masterTablesVersionNumber
- [ECC-489] - Remove unused 'name' data member from struct 'bufr_descriptor'
- [ECC-411] - Add an environment variable so that GRIB_MAX_OPEN_FILES can be user configurable

Bug Fixes

- [ECC-313] - Add support for BUFR operator 203YYY
- [ECC-433] - BUFR operator 206YYY not working
- [ECC-494] - DESTDIR ignored for Python bindings

Version 2.3.0 (May 2017)

Contributions

- [ECC-441] - MeteoFrance contribution: GRIB second order packing
- [ECC-458] - MeteoFrance contribution: GRIB spectral complex packing
- [ECC-461] - Python: GribMessage class to allow multiple keys to be set

New Features/Improvements

- [ECC-475] - BUFR WMO version 28 and local tables to be added to ecCodes
- [ECC-472] - Update GRIB2 definitions with the latest WMO V19.0.0 code tables/templates
- [ECC-452] - codes_bufr_copy_data missing in Pythonic interface
- [ECC-460] - Add centre codes for New Delhi (dems/vabb)
- [ECC-454] - Add new parameters for land reanalysis (ERA5-Land)
- [ECC-466] - Add two parameters for evaporation in the last 6 and 24 hrs
- [ECC-437] - tigge_check: bitmap fields with only undefined values
- [ECC-449] - Remove unused "unpack" data member from grib_context
- [ECC-456] - type=oi for UERRA class
- [ECC-457] - GRIB1 to GRIB2 conversion: total precipitation
- [ECC-459] - GRIB1 to GRIB2 conversion: Local Definition 5 (Forecast probability data)
- [ECC-465] - Key 'deleteLocalDefinition' works for GRIB edition 1 only

Bug Fixes

- [ECC-438] - stepUnits throws errors when processing GRIBs with stepUnit != 1 (hour)
- [ECC-444] - ecCodes fails to build when both fmemopen and funopen are available
- [ECC-447] - ecCodes Python packages not added to the installation manifest
- [ECC-448] - codes_new_from_message does not set product_kind on handle
- [ECC-451] - new pythonic interface segv
- [ECC-453] - grib_set fails randomly: Unable to set stepRange: end must be equal to start when timeRangeIndicator=10
- [ECC-467] - JRA55: map indicatorOfTypeOfLevel=101 to mars.levtype='sfc'

Version 2.2.0 (March 2017)

New Features/Improvements

- [ECC-442] - Implement codes_get_double_element for BUFR array keys (compressed data)
- [ECC-415] - Performance of eccodes used in BUFR2ODB not good for operations
- [ECC-418] - Fortran and Python codes_bufnr_keys_iterator
- [ECC-424] - codes_bufnr_keys_iterator_delete should free memory allocated for name
- [ECC-432] - GRIB2 local coding for SPP random field parameters
- [ECC-436] - Add parameters: maximum CAPE in the last 6 hours and maximum CAPES (CAPE/Shear) in the last 6 hours
- [ECC-106] - CMake: overriding default install directories

Bug Fixes

- [ECC-89] - bufnrHeaderCentre cannot be printed as string for edition 3 messages
- [ECC-406] - Cannot convert grid_simple to grid_second_order for some files
- [ECC-417] - MEMFS option does not work with Python3
- [ECC-425] - grib_to_netcdf crash when running out of memory
- [ECC-426] - Use common code tables C-1 and C-11 for GRIB/BUFR
- [ECC-429] - BUFR: The "count" key works differently from GRIB

Version 2.1.0 (January 2017)

Contributions

- [ECC-157] - Add high-level Pythonic interface (experimental)
- [ECC-369] - Differentiate exception types in Python interface
Thanks to Daniel Lee (DWD)
The high-level interface is currently experimental and may change in a future release. It is provided here to solicit feedback.
- [ECC-261] - Reduce packing error by optimizing scaling factor
Thanks to Philippe Marguinaud (MeteoFrance)
- [ECC-409] - GNU Hurd support
Thanks to Alastair McKinstry

New Features/Improvements

- [ECC-414] - Create a sample BUFR file with the new Sentinel 1 descriptors
We have included a sample BUFR file with the new Sentinel 1 descriptors approved in WMO tables 27 (released Nov 2016)
You can find this file in the data tarball. It is also downloaded when running the tests (data/bufr/sentinel1.bufr)
- [ECC-383] - Implement GRIB lat/lon iterator for 'space view'
- [ECC-358] - Update GRIB2 definitions with the latest WMO V18.0.0 code tables/templates
- [ECC-372] - Performance improvement of search by rank
- [ECC-222] - Decode BUFR data section providing only values array
- [ECC-363] - Update unbalanced component parameters with WMO GRIB2 codes
- [ECC-370] - Python: setting keys should handle both scalars and arrays
- [ECC-395] - Add a new MARS class for YOPP
- [ECC-396] - Support for Jasper 2.0
- [ECC-410] - Add GRIB2 Product Definition Template 4.58
- [ECC-412] - Support for CAMS and CERA-SAT: streams mnth/edmm/wamo/ewmm
- [ECC-357] - Implement codes_bufnr_copy_data in C, Fortran and Python
- [ECC-365] - add placeholder facility in the output filename of grib_filter (like it is done in grib_set/grib_copy)
- [ECC-379] - BUFR encoding failing when value out of range
- [ECC-382] - Provide API function to access the name of the package
- [ECC-391] - Text fix for grib_index.c
- [ECC-392] - bufnr_compare: should print double value as MISSING rather than -1e+100
- [ECC-397] - Rename parameter 260242 to '2 metre relative humidity'
- [ECC-399] - Detecting NaN values when encoding grib
- [ECC-413] - DWD local definitions: Remove superfluous tables

Bug Fixes

- [ECC-325] - Memory leaks during BUFR unpack
- [ECC-339] - Improve keys iterator for BUFR
- [ECC-376] - BUFR tables version 27 to be added to ecCodes
- [ECC-386] - GRIB: Slow-down of read routine
- [ECC-272] - Flat JSON dump of some BUFR files doesn't contain the last element
- [ECC-275] - errors.pl not creating ecCodes header files
- [ECC-336] - ctest gts failures on minimac
- [ECC-351] - grib_util_set_spec() returns a corrupted field
- [ECC-353] - grib_util_spec() does not always generate jpeg
- [ECC-355] - grib_compare: using relative comparison (-R) with "all" does not work
- [ECC-361] - Test failure: bufnr_copy_data F90 example with PGI compiler
- [ECC-364] - BUFR extractSubsets wrong result when key is constant in the extracted range
- [ECC-367] - BUFR extractSubsets for stationOrSiteName key
- [ECC-368] - Last element of a BUFR message not found when using search expression

- [ECC-373] - grib_api.h incorrectly wraps system headers in extern "C"
- [ECC-378] - Reading a file of 0 bytes does not generate any error and eventually crashes
- [ECC-380] - ecCodes attempts to link to openjpeg 1.X library if found
- [ECC-387] - Thread safety for BUFR decoding
- [ECC-388] - Missing bounds check in grib_trie.c leads to segfault
- [ECC-389] - BUFR encoding 2 values as different should be one value
- [ECC-393] - bufr_compare: cannot blacklist a key with given rank
- [ECC-398] - untrapped error : No descriptors in section 3. Malformed message
- [ECC-402] - codes_set does not set localLongitude in BUFR to correct values
- [ECC-404] - JPEG-specific tests run and fail when ENABLE_JPG is off / JPEG headers are not available
- [ECC-405] - Corrupt BUFR file: bufr_new_from_file crash
- [ECC-408] - grib_handle_new_from_partial_message should take const data pointer

Version 2.0.2 (November 2016)

- [ECC-364] - BUFR extractSubsets wrong result when key is constant in the extracted range
- [ECC-367] - BUFR extractSubsets for stationOrSiteName key
- [ECC-368] - Last element of a BUFR message not found when using search expression
- [ECC-358] - Update GRIB2 definitions with the latest WMO V18.0.0 code tables/templates
- [ECC-385] - UERRA: Type of first fixed surface 118 should be mapped to the levtype=ml

Version 2.0.0 (October 2016)

This is the first full (**Production-ready**) release of ecCodes.

This means that the application has gone through a thorough internal testing process and that all known technical issues have been resolved. It is now fully functional and ready to be released for general use.

GRIB encoding and decoding has been particularly well tested within the IFS and ecCodes replaces GRIB-API in the next [operational cycle update](#).

BUFR encoding and decoding has been tested and work has started to replace BUFRDC with ecCodes in ECMWF operational software.

Contributions

- [ECC-260] - Add support for template 5.42 (CCSDS)
Thanks to Daniel Lee (DWD) and Mathis Rosenhauer (DKRZ)
- [ECC-303] - Cannot build with OpenJPEG version 2
Thanks to Alastair McKinstry

New Features/Improvements

- [ECC-284] - Dump instructions to create the input BUFR message
- [ECC-320] - Dump instructions to decode a BUFR message
- [ECC-151] - Implement change of compression method in BUFR
- [ECC-178] - Implement codes_set for delayedReplication in BUFR
- [ECC-307] - implement area extraction in bufr_filter for compressed data
- [ECC-314] - implement extraction of a time interval in BUFR for compressed data
- [ECC-354] - simple thinning of BUFR data
- [ECC-312] - Interface change: Remove functions codes_new_from_samples and codes_handle_new_from_samples
- [ECC-297] - Add support for Data representation template 5.42 - Grid point and spectral data - CCSDS
- [ECC-285] - bufr_dump -Efilter
- [ECC-292] - bufr_dump -Efortran
- [ECC-293] - bufr_dump -Epython
- [ECC-327] - bufr_dump -EC
- [ECC-295] - codes_set_string_array Fortran
- [ECC-304] - New wave parameters as requested by member state users
- [ECC-310] - Python codes_set_array with strings
- [ECC-348] - BUFR decoding not to fail when wrong data section length
- [ECC-283] - F90/Python: Add functions for setting definitions and samples paths
- [ECC-294] - C function grib_get_data has unused argument 'size'
- [ECC-296] - Use Python distutils to install Python modules
- [ECC-300] - add some BUFR header keys to dump
- [ECC-301] - Add tests for bufr_dump -Efortran feature
- [ECC-323] - bufr_dump should fail if decoding fails
- [ECC-330] - Array size control in grib_fortran.c
- [ECC-334] - BUFR edition 3: bufr_dump does not show the key 'edition'
- [ECC-224] - Make Python and Fortran test for set by rank
- [ECC-251] - typicalDate should be localDate and read only
- [ECC-332] - GRIB-netCDF parameter mappings updates

Bug Fixes

- [ECC-200] - doxygen not working and documentation missing
- [ECC-236] - bufr_ls does not print the right value for unpacked data
- [ECC-286] - bufr_filter not able to set keys names starting with a number
- [ECC-288] - bufr_compare -R key=tolerance does not work
- [ECC-289] - problem encoding string in BUFR non compressed
- [ECC-290] - not possible to set value for operator 205YYY in BUFR
- [ECC-291] - numberOfObservations key in BUFR header conflict with element key name
- [ECC-298] - fortran codes_new_from_samples does not work for BUFR
- [ECC-299] - Fortran error messages in codes_ functions print message with grib_
- [ECC-302] - bufr_compare does not compare attributes
- [ECC-324] - bufr_dump: Segmentation fault
- [ECC-328] - Compiler warning: passing incompatible pointer types on macosx
- [ECC-333] - bufr_compare -H aborting
- [ECC-335] - grib_util_set_spec: Setting edition=2 and deleteLocalDefinition=1 on GRIB1 does not delete the local definition in target GRIB2
- [ECC-338] - Many transient keys are shown in the dump and keys_iterator
- [ECC-317] - Number of values not set correct in JPEG encoded constant field.
- [ECC-319] - GRIBEditionNumber returns "?" if queried as a string
- [ECC-316] - GRIB1: Representation of 'seconds' unit (15) disagrees with WMO table 4 (254)
- [ECC-308] - grib_to_netcdf duplicate grib message error output
- [ECC-331] - grib_get_size returns incorrect size for GRIB 1 'reservedNeedNotBePresent' key

Version 0.16.0 Beta (June 2016)

New Features/Improvements

- [ECC-280] - Provide feature to build the definition files and samples into the library
For further details see [Memory based access to definition/sample files](#)
- [ECC-274] - BUFR tables version 26 to be added to ecCodes
- [ECC-276] - Change BUFR shortNames to avoid clashes in different classes
- [ECC-267] - rename BufrTemplate to bufrTemplate
- [ECC-269] - Provide equivalent of the C function codes_get_string_array in Fortran interface
- [ECC-257] - Debugging: print filename and line number of triggered IF statement
- [ECC-258] - Add support for Météo-France field name translation
- [ECC-250] - bufr header documentation incorrect
- [ECC-253] - Add tests for converting GRIB packingType to PNG
- [ECC-277] - F90 Examples: replace 'double precision' with 'real(8)'
- [ECC-263] - Add functions for setting definitions and samples paths

Bug Fixes

- [ECC-143] - Error in BUFRDC & eccodes BUFR Table D Version 16
- [ECC-210] - ecCodes Segmentation fault with DWD BUFR-encoded synop data
- [ECC-233] - Stray comma character in BUFR json dump
- [ECC-252] - grib_count_in_file() function does not support multi-field GRIB messages
- [ECC-254] - grib_handle_new_from_message should take const data pointer
- [ECC-255] - Parameters 186/187 (Low/Medium cloud cover) have incorrect WMO GRIB1 codings
- [ECC-256] - Wrong decoding of nested delayed replication
- [ECC-259] - numberOfValues not correctly set when using second order packing with missing values
- [ECC-265] - totalLength of edition 3 BUFR not changed on reshape
- [ECC-270] - Wrongly decoded associated field in TAMDAR data
- [ECC-271] - National and WMO station number elements in BUFR SYNOP data use the same key

Version 0.13.0 Beta (February 2016)

New Features/Improvements

- [ECC-218] - Implement BUFR edition change 3 to 4
- [ECC-181] - Implement set of key with search by rank
- [ECC-196] - Update the bufr_read_temp example
- [ECC-183] - Implement key BufrTemplate
- [ECC-203] - Remove the function grib_context_new
- [ECC-214] - BUFR tables version 25
- [ECC-219] - BUFR extracting subsets
- [ECC-207] - Make read only delayedDescriptorReplicationFactor and expandedDelayedDescriptorReplicationFactor
- [ECC-208] - Create messages with more than 1 replication when setting unexpandedDescriptors
- [ECC-194] - Change the misleading "grib1" prefix for filenames in the definitions/mars directory

Bug Fixes

- [ECC-197] - Problem in decoding missing repetition blocks in nested repetitions
- [ECC-225] - Key edition in BUFR and good default for internationalDataSubCategory

- [ECC-204] - Python bindings: make numpy a requirement (drop support for python arrays)
- [ECC-206] - Support the GRIB-API environment variable names
- [ECC-213] - Adding section 2 in BUFR produces broken message
- [ECC-220] - Problem decoding some BUFR bitmap elements
- [ECC-223] - Problem decoding wind profiler associated fields

Version 0.12.0 Beta (November 2015)

New Features/Improvements

- [ECC-128] - Implement encoding of unexpandedDescriptors
- [ECC-133] - Decode and re-encode a BUFR message
- [ECC-150] - Implement codes_set for elements in BUFR data section
- [ECC-158] - Change internal representation and encoding of strings in BUFR
- [ECC-162] - bufr_filter is printing double precision values with %g. Not enough in some cases.
- [ECC-171] - Make users aware of the change of CODES_MISSING_LONG
- [ECC-185] - Implement the concept for bufrTemplate
- [ECC-186] - Put content in the BUFRTemplate.def file
- [ECC-187] - Document bufrTemplate key on the wiki
- [ECC-53] - Make bufr subsets accessible in the API
- [ECC-84] - Fix spelling errors in BUFR key names
- [ECC-141] - Return an array of strings after decoding similar to BUFRDC
- [ECC-149] - Setting unexpandedDescriptors without changing data section
- [ECC-109] - Example for Tropical cyclones
- [ECC-138] - Examples for bufr_filter have disappeared
- [ECC-148] - New test for bufr_compare
- [ECC-169] - wiki changes for 0.12.0 release
- [ECC-175] - Create separate confluence page for tools examples
- [ECC-176] - Update bufr tables in confluence for 0.12.0 release
- [ECC-184] - Create python example to read CSV and encode BUFR
- [ECC-188] - PEP8ify Python examples

Bug Fixes

- [ECC-126] - eccodes can't decode E-AMDAR data from GTS
- [ECC-129] - allocating before calling codes_get in fortran does not work
- [ECC-134] - Case-sensitivity of codetable keys
- [ECC-135] - Test fails when floating point exceptions are enabled
- [ECC-137] - Change syntax of keys for access by rank
- [ECC-140] - Search by condition does not work in some situations
- [ECC-144] - Performance: ecCodes should be as fast as grib api
- [ECC-147] - keys_iterator does not iterate on BUFR data keys
- [ECC-152] - Crash: Calling python codes_set_array() instead of codes_set_double_array()
- [ECC-154] - Python module installs as "grib_api/gribapi.py" instead of "gribapi/__init__.py".
- [ECC-155] - Crash: calling codes_dump from Fortran
- [ECC-156] - CMake: Does not find Jasper (Ubuntu)
- [ECC-160] - ecCodes 0.11.0 and FM35_BUFR sounding data
- [ECC-163] - Valgrind error: running the test bufr_filter.sh
- [ECC-167] - codes_get_X does not search by condition and rank
- [ECC-170] - CODES_MISSING_DOUBLE and CODES_MISSING_LONG not in fortran
- [ECC-172] - attributes not working in search by condition
- [ECC-177] - Valgrind error in search_from_accessors_list: Invalid read
- [ECC-180] - Test failure with cray intel compiler: bufr_subset.sh

Version 0.11.0 Beta (May 2015)

New Features/Improvements

- [ECC-97] - Add METAR decoder and tests
- [ECC-99] - Implement operator 208XXX and few others
- [ECC-112] - Add test for native type changed by operator
- [ECC-120] - Change wiki examples to comply with distribution
- [ECC-100] - CMake: Rename GRIB_THREADS to ECCODES_THREADS
- [ECC-101] - Skip confusing padding like GRIB or BUFR
- [ECC-103] - bufr_dump option to dump code, scale, reference and width
- [ECC-110] - Create a test for BUFR bad data
- [ECC-116] - Correct BUFR element shortNames

Bug Fixes

- [ECC-85] - Accessing keys by condition does not work in python
- [ECC-102] - Unable to decode high resolution TEMP
- [ECC-104] - Overflow: computing the size of the codetable
- [ECC-107] - BUFR tables missing
- [ECC-108] - Return error when data section is not big enough
- [ECC-111] - Change of scale does not change element type
- [ECC-115] - Problem with bufr operator 205YYY

Version 0.10.0 Beta release (March 2015)