Application and verification of ECMWF products 2012

HMSS (Hydrometeorological and Seismological Service) of MONTENEGRO

1.   Summary of major highlights

ECMWF forecast products became the backbone in operational work during last several years. Starting from ten days deterministic forecast, amount of products in use is growing constantly including EPS, EFI, seasonal forecast etc. Available ECMWF software like MetView and GRIB_API are installed last year and ready for use.

NMM HIRES use ERA fields for case studies and numerical tests for different regions.

Demand for forecast archive and data base appeared during last year, so HMSS requested MARS installation.

2.   Use and application of products

ECMWF products are used for short-range forecast for providing meteorological background for hail suppression activities, specialized service in Ministry of Internal Affairs.

Medium-range forecast is mainly based on ECMWF products from deterministic model as well as EPS products available on ECMWF web site.

NMM HIRES, a non-hydrostatic limited-area model, has been running operationally since of begin when model start. Model uses ECMWF boundary conditions for 72 hours ahead and is still work with excellent result.

WRF-NMM V3.3.1, the state of art non-hydrostatic limited installed this summer with boundary conditions for 144 hours from deterministic ECMWF model .

Some of ECMWF forecast products, like CAPE and EFI are widely used in every day work. Wind gusts, 2m minimum and maximum daily temperature forecast as well as daily amount of precipitation are used as a background in the severe weather warnings.
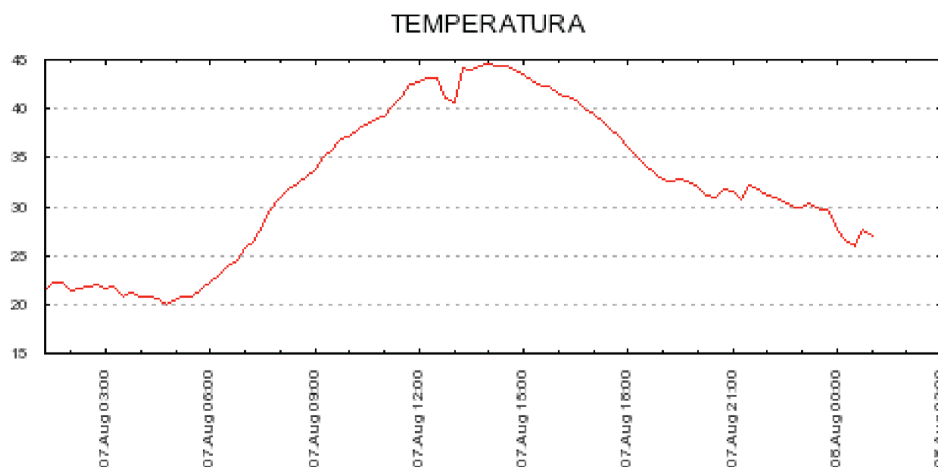
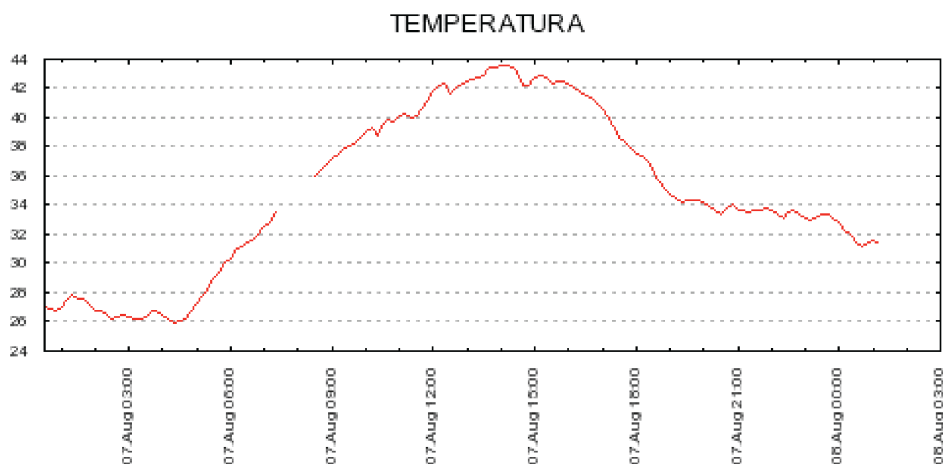## 3.   Verification of products

Positive experiences:

From August 5 to 9 August this year 2012 in Montenegro we had extremely high temperatures.

The ECMWF EFI is be excellent for temperature

Danilovgrad from AWS, T 2m on 10 min:

Podgorica from AWS, T 2m on 10 min:

TEMPERATURA

NMM – high resolution model with dx=dy=0.04 degree horizontal resolution

Who start with grib data from Deterministic Global Model is give forecast for temperature with 0.5 degree Celsius error, this is incredibly . Only this model who start with boundary condition from ECMWF give forecast for temperature on 2 m over 43 degree Celsius on this area.

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NMM1e DANILOVGRAD   (42.49,19.20)   nad.Visina:  53m;    ????: 241m
------------------------------------------------------------------
+hh YYYY MM DD HH       t2[C]  th1[C]  th2[C]  th3[C] th4[C] th5[C]
                                                                   _
+   0  2012  8  6  0    27.1    25.0    24.8    24.6   24.5   24.3
+   3  2012  8  6  3    20.8    23.3    24.4    24.6   24.4   24.0
+   6  2012  8  6  6    27.5    26.5    25.6    24.8   24.5   24.3
+   9  2012  8  6  9    34.9    32.7    31.7    30.6   29.4   28.1
+  12  2012  8  6 12    39.8    37.3    36.2    35.2   34.0   32.6
+  15  2012  8  6 15    40.5    38.8    37.9    36.9   35.8   34.5
+  18  2012  8  6 18    34.5    35.9    35.5    34.7   33.8   32.8
+  21  2012  8  6 21    30.0    31.9    33.1    33.4   33.0   32.5
+  24  2012  8  7  0    25.4    27.7    29.8    30.5   30.8   30.5
+  27  2012  8  7  3    22.8    25.2    27.6    28.5   28.8   29.2
+  30  2012  8  7  6    30.0    29.2    28.3    28.8   28.9   29.2
+  33  2012  8  7  9    39.1    37.0    36.0    34.9   33.7   32.4
+  36  2012  8  7 12    45.3    42.9    41.8    40.8   39.6   38.3
+  39  2012  8  7 15    42.7    41.0    40.0    38.9   37.8   36.4
+  42  2012  8  7 18    37.4    38.8    38.4    37.6   36.6   35.3
+  45  2012  8  7 21    30.6    32.9    34.1    34.8   34.7   33.8
+  48  2012  8  8  0    25.4    27.7    31.2    32.8   32.8   32.1
+  51  2012  8  8  3    25.2    27.8    27.3    30.4   30.9   30.7
+  54  2012  8  8  6    31.0    30.1    29.1    29.1   28.9   28.1
+  57  2012  8  8  9    37.7    35.5    34.4    33.4   32.2   30.8
+  60  2012  8  8 12    41.3    38.8    37.7    36.7   35.5   34.1
+  63  2012  8  8 15    38.9    37.5    36.6    35.7   34.5   33.2
+  66  2012  8  8 18    35.0    35.0    34.4    33.6   32.6   31.5
+  69  2012  8  8 21    32.2    33.0    33.4    32.8   32.0   30.7
+  72  2012  8  9  0    28.4    30.2    30.1    29.4   28.9   27.9
+  75  2012  8  9  3    27.5    28.1    27.9    27.4   26.9   27.1
+  78  2012  8  9  6    29.9    28.9    27.8    26.8   25.7   25.1
+  81  2012  8  9  9    35.5    33.2    32.2    31.2   30.0   28.7
+  84  2012  8  9 12    38.9    36.4    35.4    34.4   33.2   31.8
+  87  2012  8  9 15    39.0    37.3    36.4    35.5   34.4   33.0
+  90  2012  8  9 18    34.3    35.4    35.2    34.5   33.7   32.7
+  93  2012  8  9 21    30.9    31.7    32.2    31.9   31.0   29.8
+  96  2012  8 10  0    28.0    28.6    28.4    28.0   27.1   27.0
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