HW dates selection

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IDENTIFICATION OF HEAT WAVES DATES AT LARGE SPATIAL DOMAIN

1) starts from 't?_ECAD_Duration_HeatWave_Cut1_Extended_Marginal.nc files;
2) identifies the whole relative maximum and their dates;
3) creates output files (ASCII and NetCDF) ******* The data listed below can be loaded into R from the following file:

```
load("HW_SpatialExtension.RData")
ls()
```

```
## [1] "tn_Area1_final"        "tn_Area1_finalMaySept" "tn_Area1_tab"
## [4] "tn_Area1_tabMaySept"   "tx_Area1_final"        "tx_Area1_finalMaySept"
## [7] "tx_Area1_tab"          "tx_Area1_tabMaySept"
```

The objects `tn_Area1_final` and `tx_Area1_final` have been also created both as *.txt* and *.nc* files. These files are loaded in the GitHub repository.

The `tn_Area1_final` and `tx_Area1_final` are multiple time series. The table below is an example of HW events selection for **tn**:

```
##               x   x7  x10
## 2003-05-27 1850    0    0
## 2003-05-28 2331    0    0
## 2003-05-29 2653    0    0
## 2003-05-30 2745    0    0
## 2003-05-31 2784    0    0
## 2003-06-01 2801 2801 2801
## 2003-06-02 2704    0    0
## 2003-06-03 2400    0    0
## 2003-06-04 2075    0    0
## 2003-06-05 1563    0    0
## 2003-06-06 1059    0    0
## 2003-06-07 1335    0    0
## 2003-06-08 1415    0    0
## 2003-06-09 1372    0    0
## 2003-06-10 1501 1501    0
## 2003-06-11 1480    0    0
## 2003-06-12 1357    0    0
## 2003-06-13 1362    0 1362
## 2003-06-14 1033    0    0
## 2003-06-15  876    0    0
## 2003-06-16  583    0    0
## 2003-06-17  404    0    0
## 2003-06-18  344  344    0
## 2003-06-19  258    0    0
```

```
## 2003-06-20  132    0    0
## 2003-06-21  102    0    0
## 2003-06-22   94    0    0
## 2003-06-23   89    0    0
## 2003-06-24  187    0    0
## 2003-06-25  371    0    0
## 2003-06-26  443    0    0
## 2003-06-27  465    0    0
## 2003-06-28  550    0    0
## 2003-06-29  588  588  588
## 2003-06-30  565    0    0
## 2003-07-01  378    0    0
## 2003-07-02  465    0    0
## 2003-07-03  471    0    0
## 2003-07-04  474    0    0
## 2003-07-05  419    0    0
## 2003-07-06  427    0    0
## 2003-07-07  409    0    0
## 2003-07-08  358    0    0
## 2003-07-09  398    0    0
## 2003-07-10  395    0    0
## 2003-07-11  411  411  411
## 2003-07-12  284    0    0
## 2003-07-13  228    0    0
## 2003-07-14  237    0    0
## 2003-07-15  221    0    0
## 2003-07-16  271    0    0
## 2003-07-17  357    0    0
## 2003-07-18  299    0    0
## 2003-07-19  332    0    0
## 2003-07-20  755    0    0
## 2003-07-21 1632 1632    0
## 2003-07-22 2168    0    0
## 2003-07-23 2364    0    0
## 2003-07-24 2399    0    0
## 2003-07-25 2394    0    0
## 2003-07-26 2407    0    0
```

where the column `x` represents the number of cells in the domain area (Central-Western Mediterranean basin) which have been hit by an HW; the column `x7` is built searching iteratively the maximum number of cells once the nearest 7 time points $(-7days; +7days)$ are set to 0; and the column `x10` is similar to `x7` except for the time window which is $(-10days; +10days)$.

The results of setting different time windows is reported in the following tables, where the reported **HW events** are also tabulated according to classes of cells number involved in each event:

```
tn_Area1_tab
```

```
##            0-50 50-100 100-300 300-500 500-2801
## 7daysCut  22903    200     313     141       168
## 10daysCut 23049    140     249     129       158
```

```
tx_Area1_tab
```

```
##            0-50 50-100 100-300 300-500 500-2905
## 7daysCut  22989    153     275     115       193
## 10daysCut 23094    115     238      97       181
```

The same tables for the period May-September are reported below:

```
tn_Area1_tabMaySept
```

```
##           0-50 50-100 100-300 300-500 500-2801
## 7daysCut  9573     86     134      72        80
## 10daysCut 9652     55     101      63        74
```

```
tx_Area1_tabMaySept
```

```
##           0-50 50-100 100-300 300-500 500-2786
## 7daysCut  9622     66     120      50        87
## 10daysCut 9668     47     108      42        80
```

CONCLUSIONS

The 10-days time window tends to leave out several important events. On the other hand, the 7-days time window may split a unique HW event into two. However, it is worth noticing that, for the period May-September, the number of events selected by the two type of time windows above the threshold of 300 cells is very similar and the total number of **tn**(**tx**) HW events sum up to 152(137) and 137(122) for 7-days and 10-days, respectively. **My proposal is to take** 300 **as minimum number of cells involved (spatial extension of the HW) and 7-days time window for cutting out dates of the same HW**.