ESA-MOST Dragon Cooperation

中国科技部-欧洲空间局合作“龙计划”

DRAGON 2 FINAL RESULTS AND DRAGON 3 KO SYMPOSIUM

“龙计划”二期总结研讨会暨三期启动会

Fire Radiative Energy Estimation from Sparse Satellite Observations and its Relationship With Fire Emissions, Biomass Burned and Fire Severity, in China

Id. 10350

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OBJECTIVES

1.- To describe the forest fire FRP probability distribution, on several areas of China, as a power law.

2.- To obtain the forest fire FRE from the FRP distribution power law.

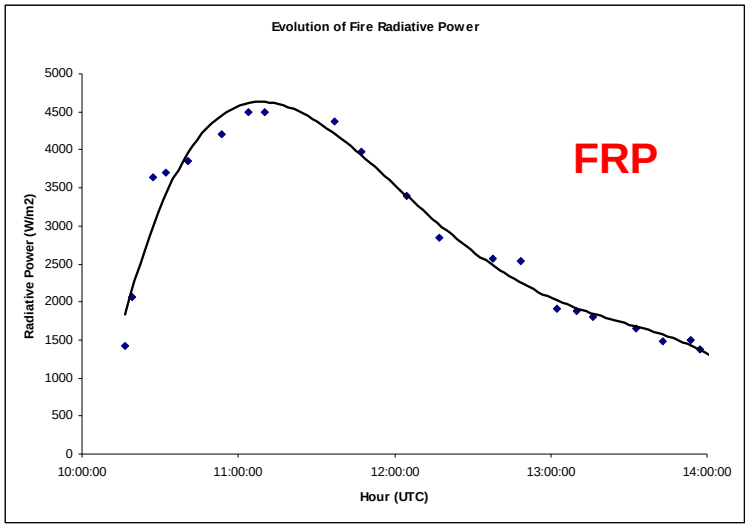
3.- To get the biomass burned on the analyzed areas by means the FRE.

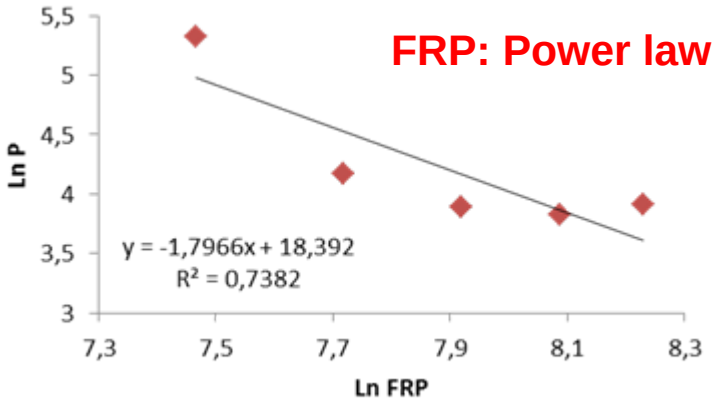
4.- To define a relationship between the FRE released and the CO/CO_2 forest fire emissions.

5.- To analyze the post-fire environment in terms of the emitted FRE.

Oak prescribed fire at CIBA

PCE-TC 4





Assuming that the FRP over the duration of the fire follows a power law distribution, then its probability distribution function is as:

$$P(FRP) = c.\ FRP^{-m}$$

P(FRP) is the probability distribution function of **FRP**
c is a constant
m is a scaling parameter,

then*

$$FRE_{pwr\ law} = \frac{\left[d(1-m)/(2-m)\right]\left[FRP_{\max}.(-m+2) - FRP_{\min}(-m+2)\right]}{\left[FRP_{\max}(-m+1) - FRP_{\min}(-m+1)\right]}$$

where FRP_{max} and FRP_{min} are the maximum and minimum possible FRP values and **d** the fire duration.

* From S. S. Kumar, D. P. Roy, L. Boschetti and R. Kremens, "Exploiting the power law distribution properties of satellite fire radiative power retrievals: A method to estimate fire radiative energy and biomass burned from sparse satellite observations", JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 116, 2011.

HOW TO DO THAT?

1.- Historical fires over homogeneous Chinese regions will be analysed and its FRP will be calculated.

2.- c and m values will be obtained by a fitting methodology

3.- FRP_{max} and FRP_{min} will be set as the maximum and minimum observed values.

4.- d will be obtained from the satellite measurements or from local information.

5.- From FRP_{max} and FRP_{min} and d, FRE will be calculated

Task 1 to 5 will be carried out by European and Chinese teams
These tasks cover objectives 1 & 2

3.- To get the biomass burned on the analyzed areas by means the FRE.

$$BB = k.FRE$$

BB is the biomass burned
k is a constant to be fitted (0.30 to 0.38 kg/m^2.J)

4.- To define a relationship between the FRE released and the CO/CO_2 forest fire emissions.

5.- To analyze the post-fire environment in terms of the emitted FRE.

These objetives will be carried out by European and Chinese teams, but 3&5 will be lead by Chinese team and 4 by European team.

SCHEDULE

1.- 1st Year

1-1.- Selection of pilot areas. CP*
1-2.- Local data recovery and local data analysis (Historical fire data, land cover classes, maps, climatological conditions etc). CP.
1-3.- Set up of a common methodology for FRP and FRE calculation
1-4.- Download of historical forest fires data.

2.- 2nd Year

2-1.- To calculate forest fire data: fire temperature, FRP, burning area etc.
2-2.- To fit the FRP distribution power law for each pilot area
2-3.- To get the FRE for each fire.
2-4.- To recover data from current fires

*CP: Chinese partners

SCHEDULE

3.- 3rd Year

3-1.- To analyse the burned biomass for different forest.
3-2.- To recover and fit the CO/CO_2 emissions
3-3.- To analyze the post fire effects by means of estimated FRE .

4.- 4th Year

4-1.- To complete previous activities
4-2.- To elaborate final results and conclusions

MANY THANKS FOR YOUR KIND ATTENTION