

Terrestrial Surface Water State Indicators

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Project Summary

Terrestrial surface hydrologic state variables provide unique insight into linkages and feedbacks in terrestrial energy, water and carbon cycles

when considered alone are poor indicators of climate change

From : Nick Steiner

<http://happy.ccny.cuny.edu/indicators/README.html>

Indicators

a. Land Surface Freeze/Thaw State

The freeze/thaw (F/T) state of the ground over North America has been characterized using microwave frequency active and passive remote sensing data combined to produce a unified F/T product.

b. Surface Inundation

The state of surface inundated area fraction (Fw) for North America is assembled from the global time series of the NASA Inundated Wetlands Earth System Data Record (ESDR)(<http://wetlands.jpl.nasa.gov>).

Indicators

c. Snow Water Equivalent (SWE)

The daily estimate of snow water equivalent (SWE), the amount of snow on the ground in the equivalent water depth,

d. Energy Flux Datasets

Radiative fluxes are associated with downwelling short/longwave solar radiation and subsequent emission of the heat from Earth's surface at longwave frequencies.

What's the point?

Carefully tracking the combination of these state variables with the location they influence supports how both are linked. How does the location affect the climate? How does the climate affect the locations. Are similar locations around the world linked to the same climate patterns? To find answers and more importantly create even more questions from the data is the main goal.

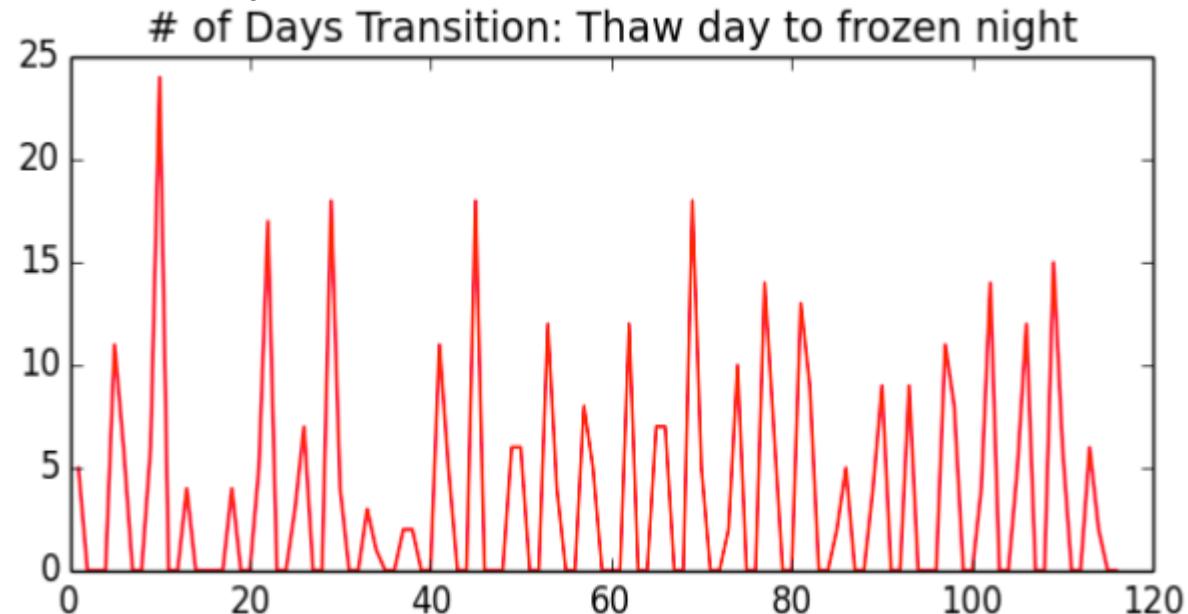
Journey So Far....

In the beginning we created scatter plots for one variable for a certain location.

Location:

Lat: 37.98058

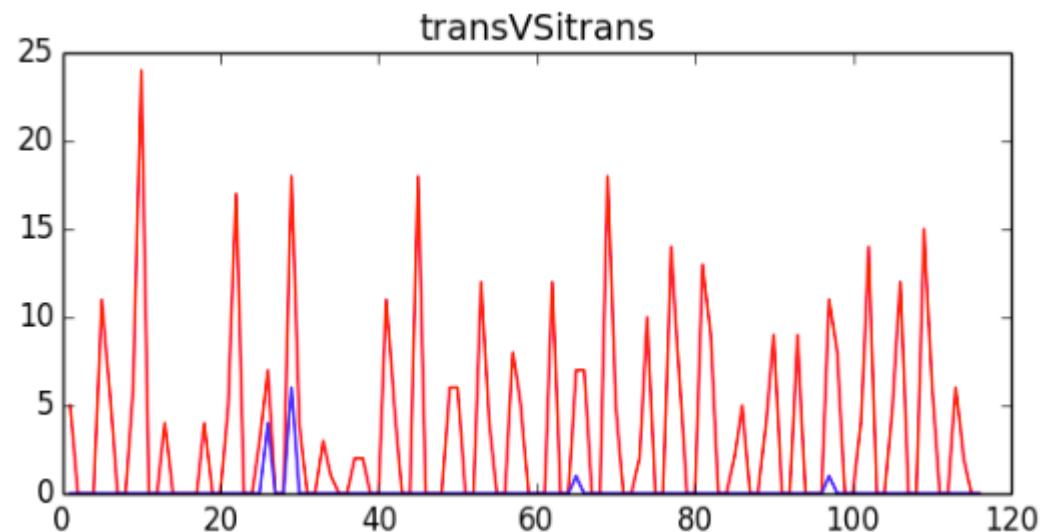
Lon: 140.0957



We plotted two variables together in s

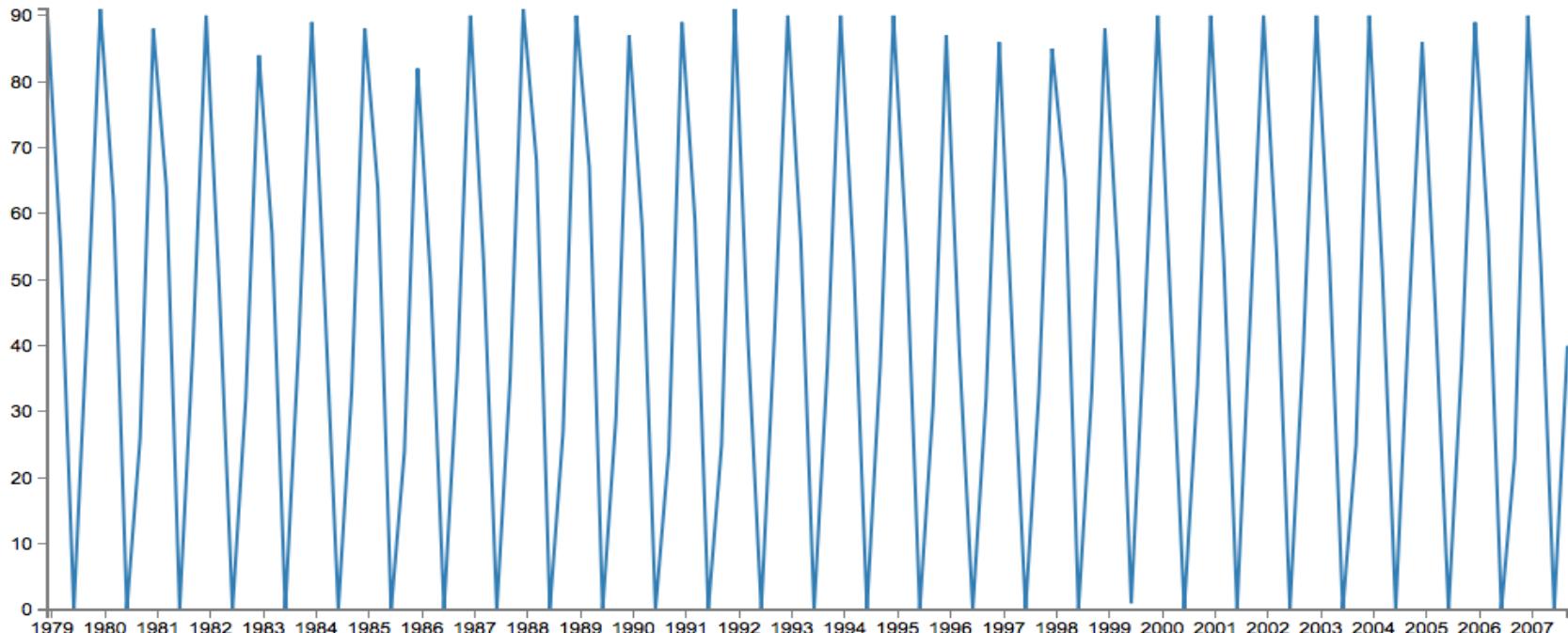
Red: Thawed during day
And frozen during night

Blue: Thawed during night
And frozen during day



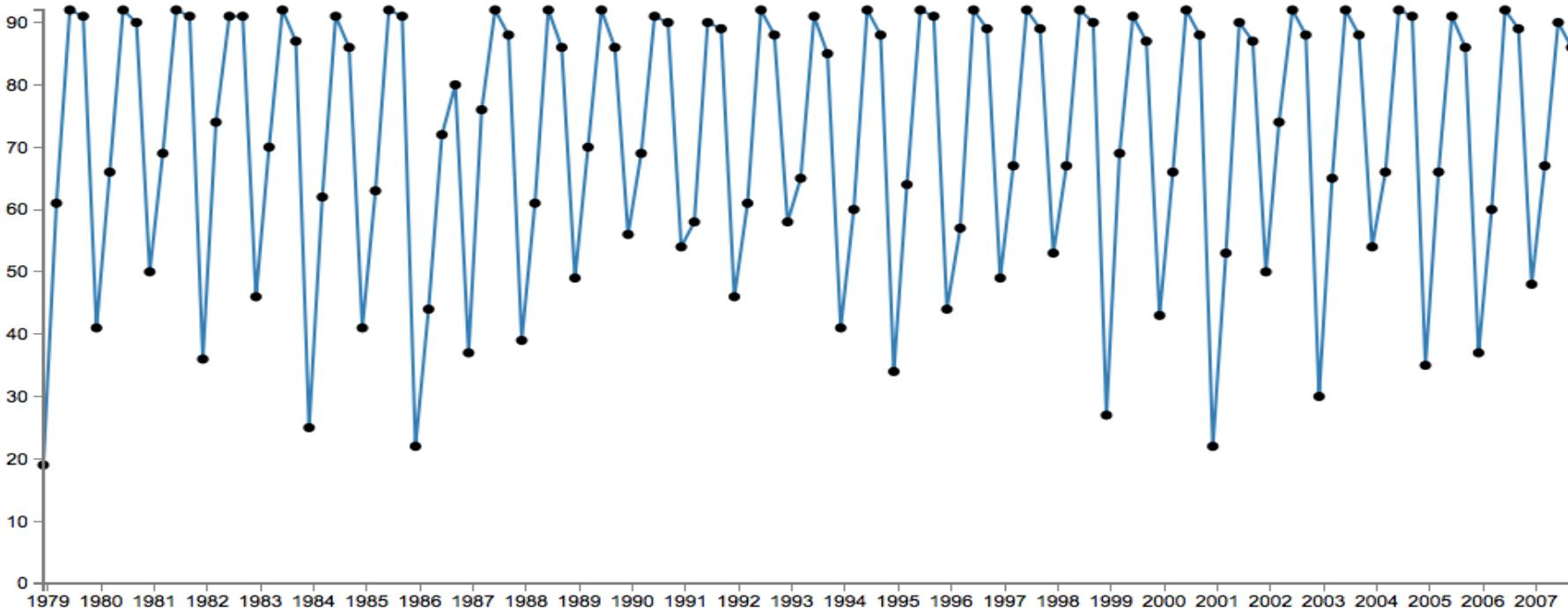
Frozen Days over years

ft_frozen location 3000: latitue 58.37502 , longtitue 161.04181



Thawed State

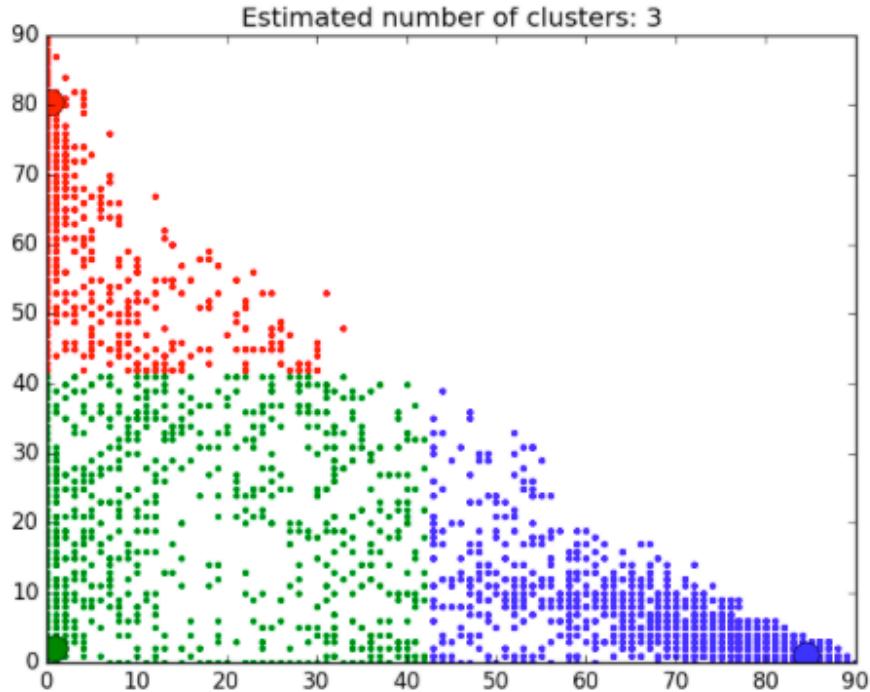
ft_thawed location 1000: latitue 41.67762 , longtitue 140.26495



Using Meanshift ALgorithm

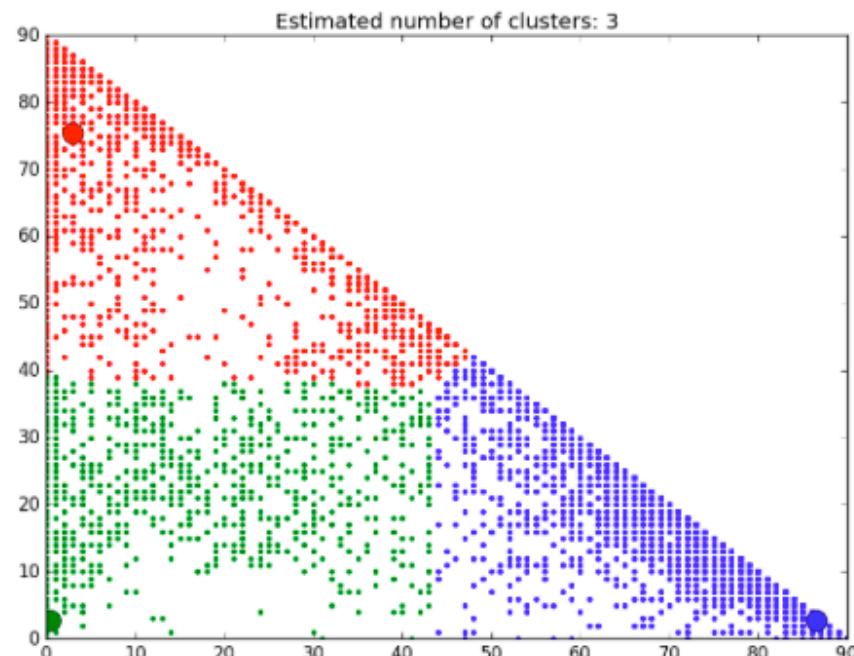
Date: 2005-12-01

X: [4] ft_frozen Y: [5] ft_thawed

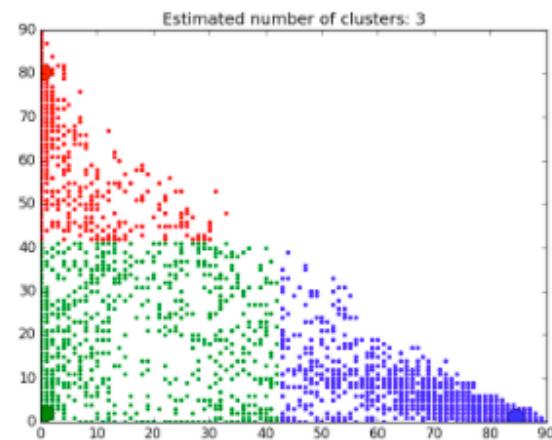


Location index: 0:10000

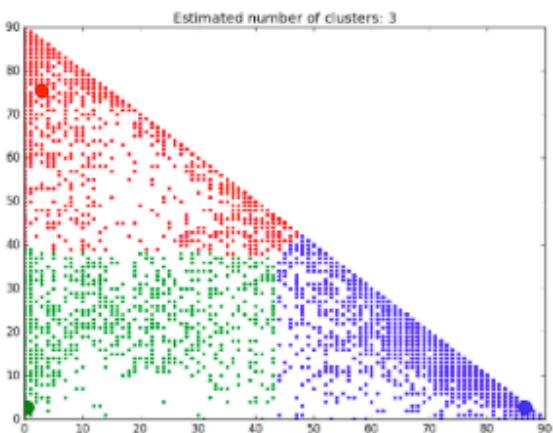
X: [4] ft_frozen Y: [6] ft_trans



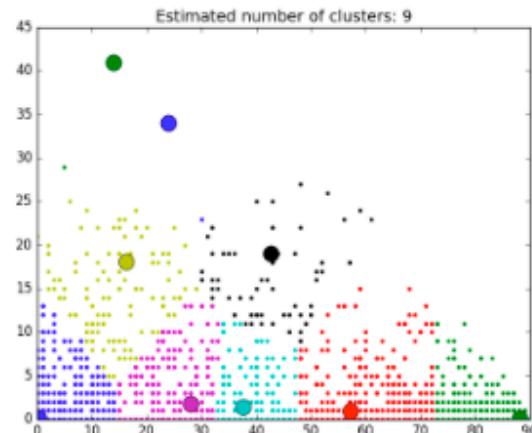
X: [4] ft_frozen Y: [5] ft_thawed



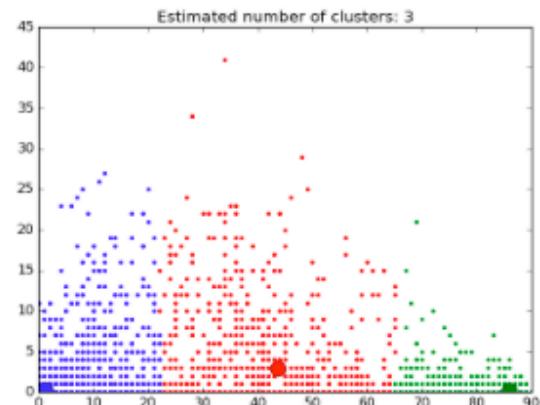
X: [4] ft_frozoe Y: [6] ft_trans



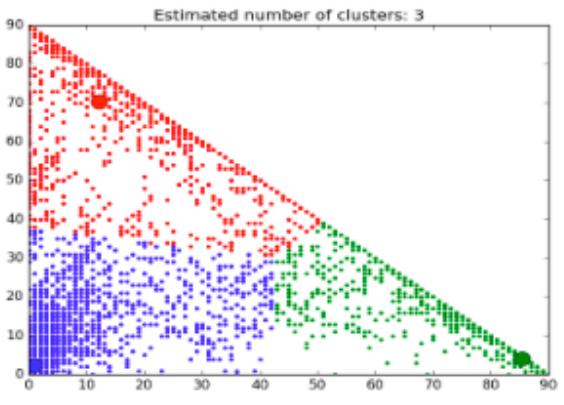
X: [4] ft_frozen Y: [7] ft_itrans



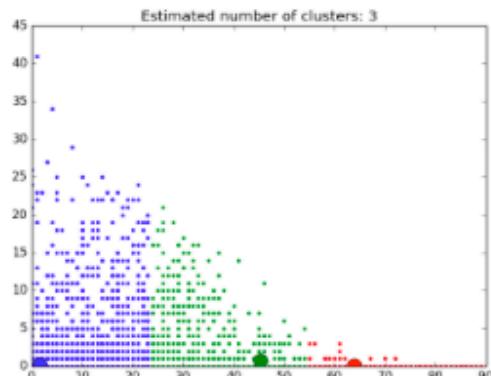
X: [5] ft_thawed Y: [7] ft_itrans



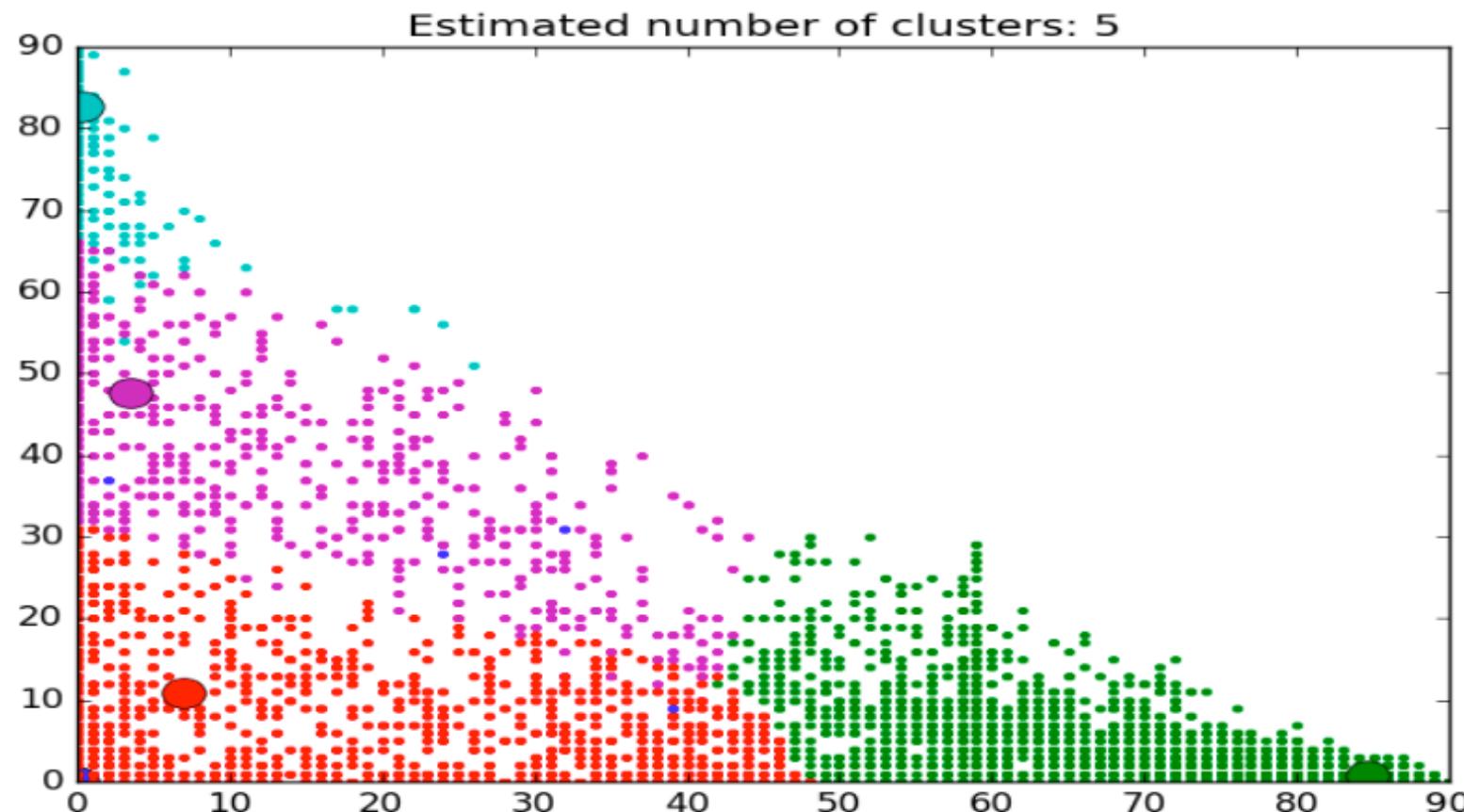
X: [5] ft_thawed Y: [6] ft_trans



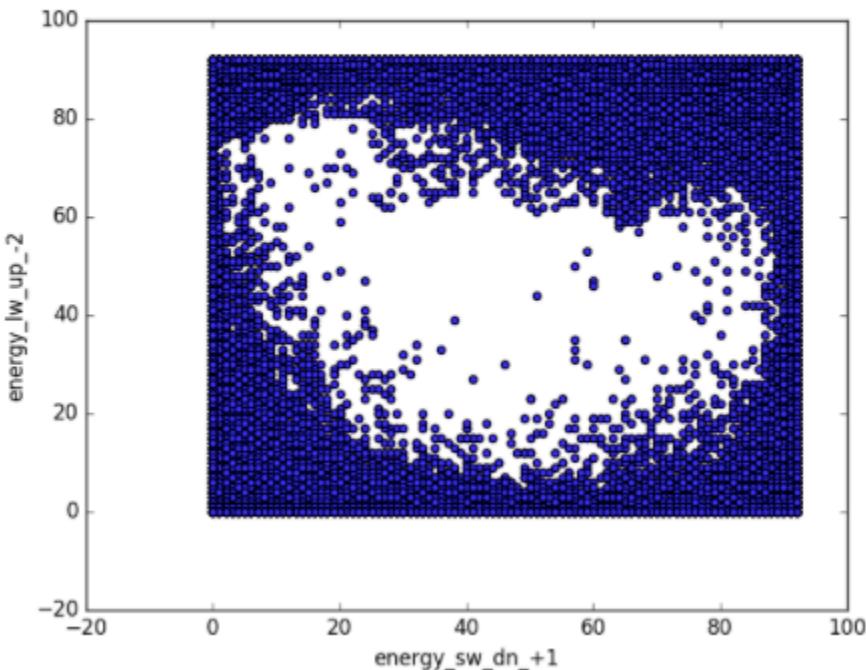
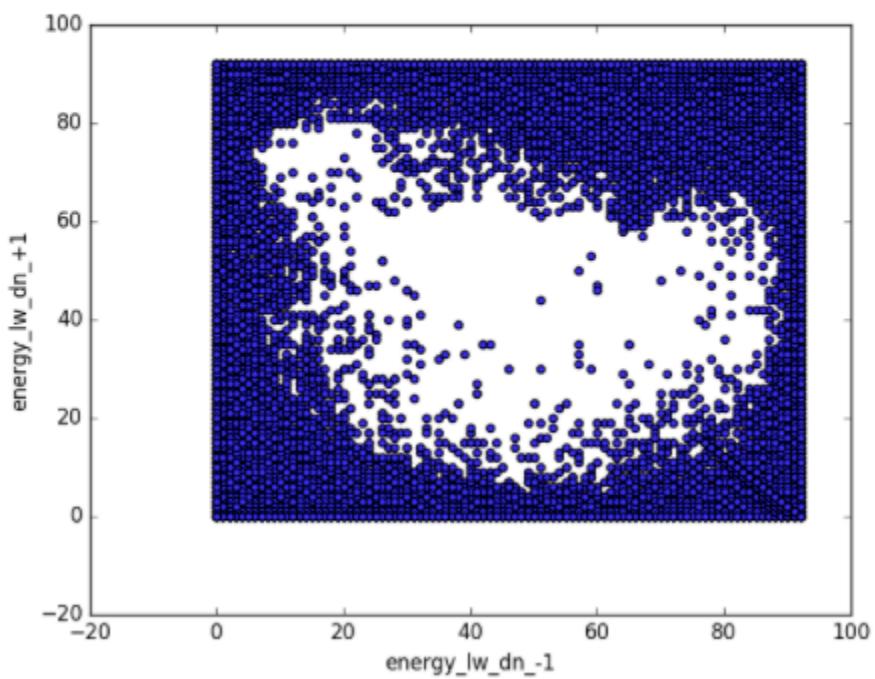
X: [6] ft_trans Y: [7] ft_itrans



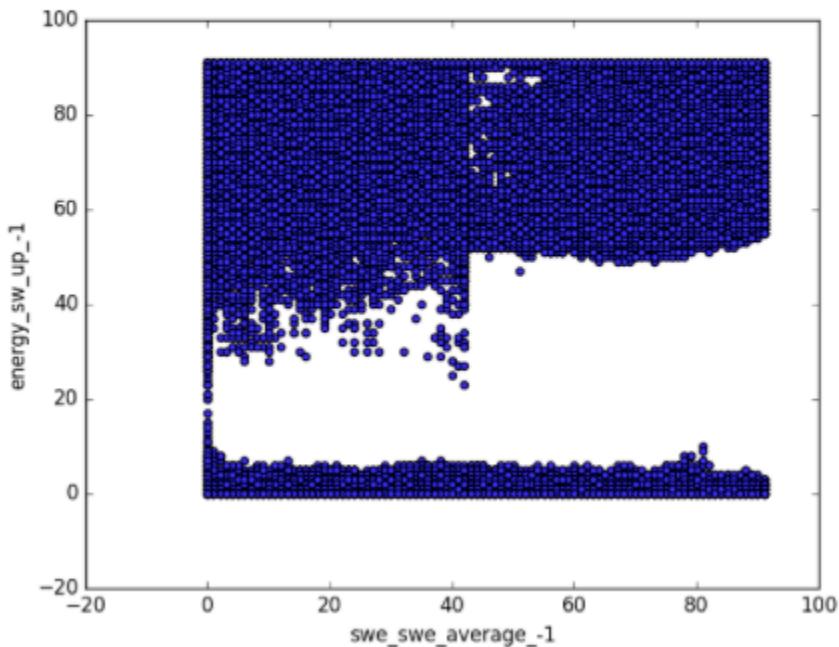
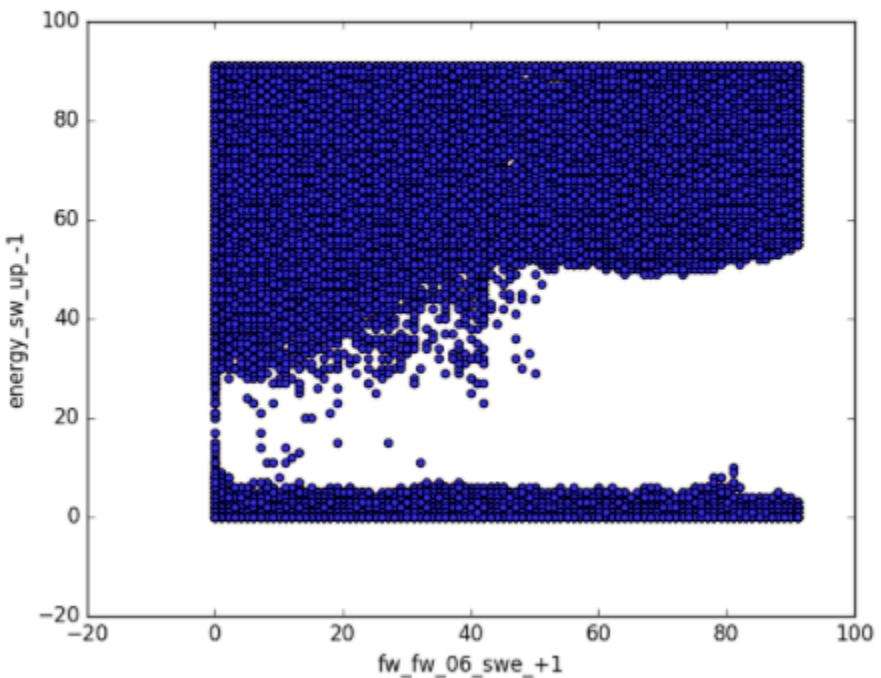
[4] ft_frozen [5] ft_thawed [6] ft_trans [7] ft_itrans



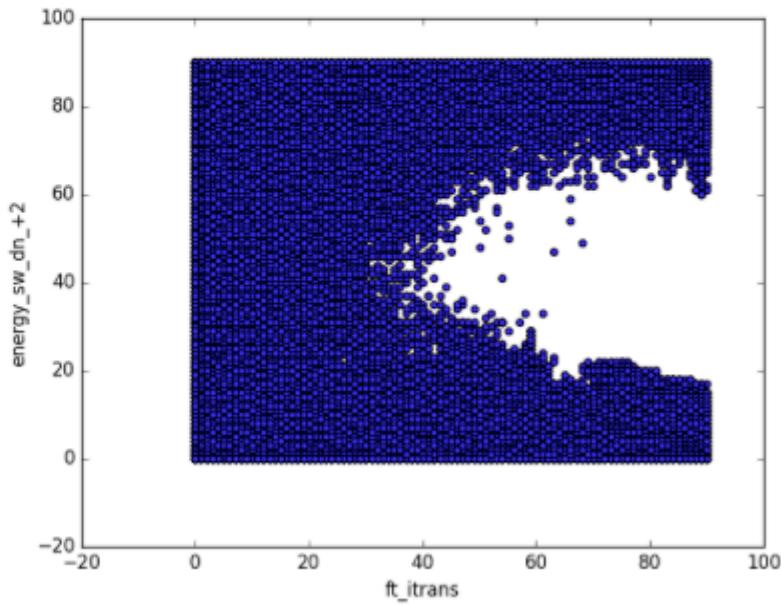
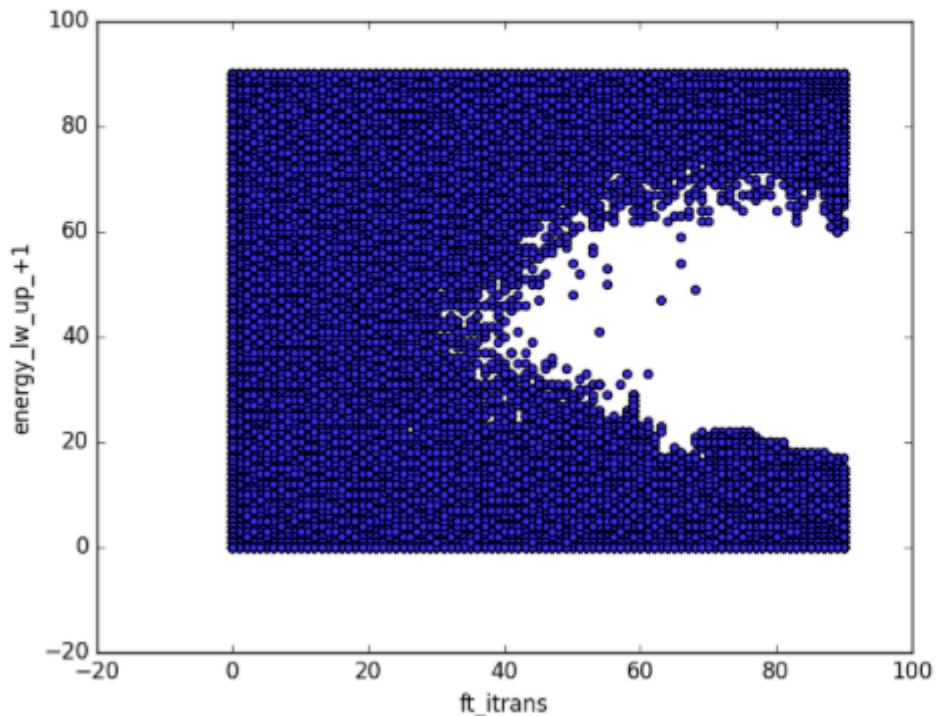
Summer 2005



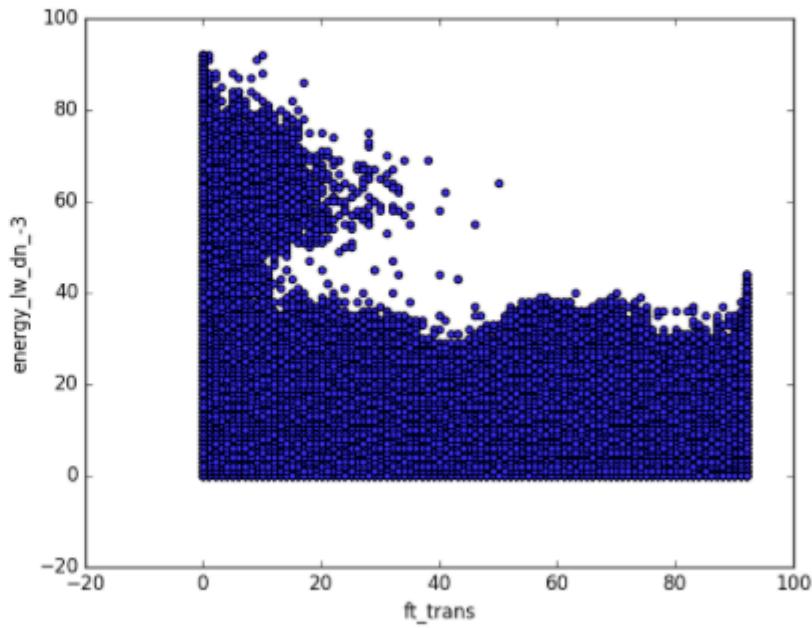
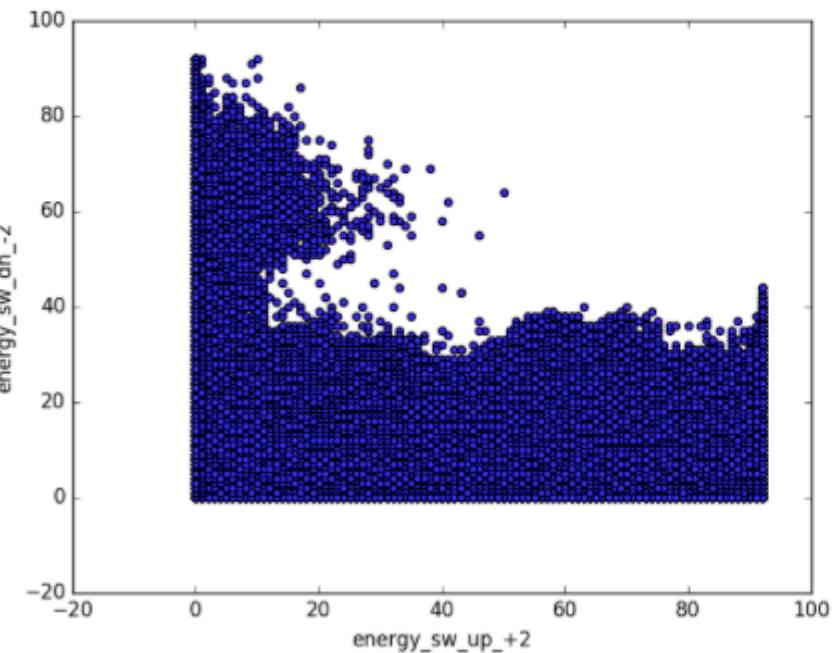
Fall 2005



Winter 2005

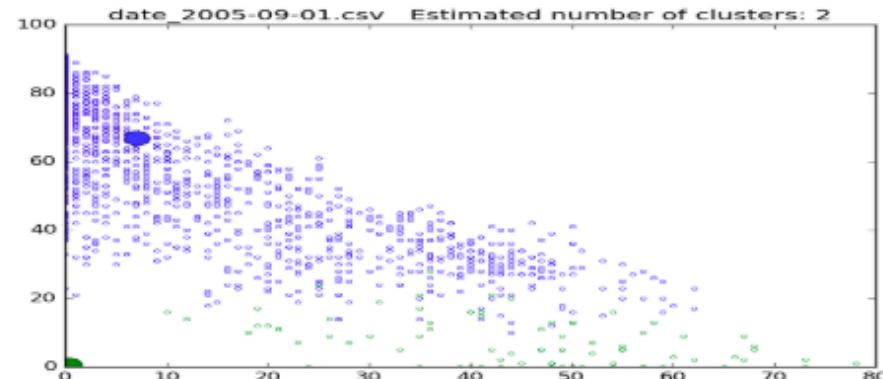


Spring 2005

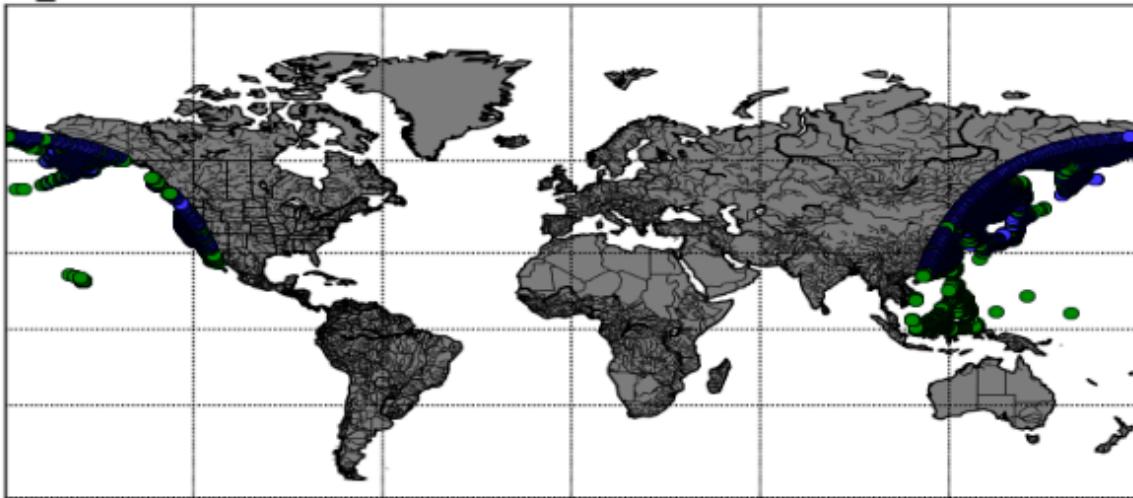


34 Variables

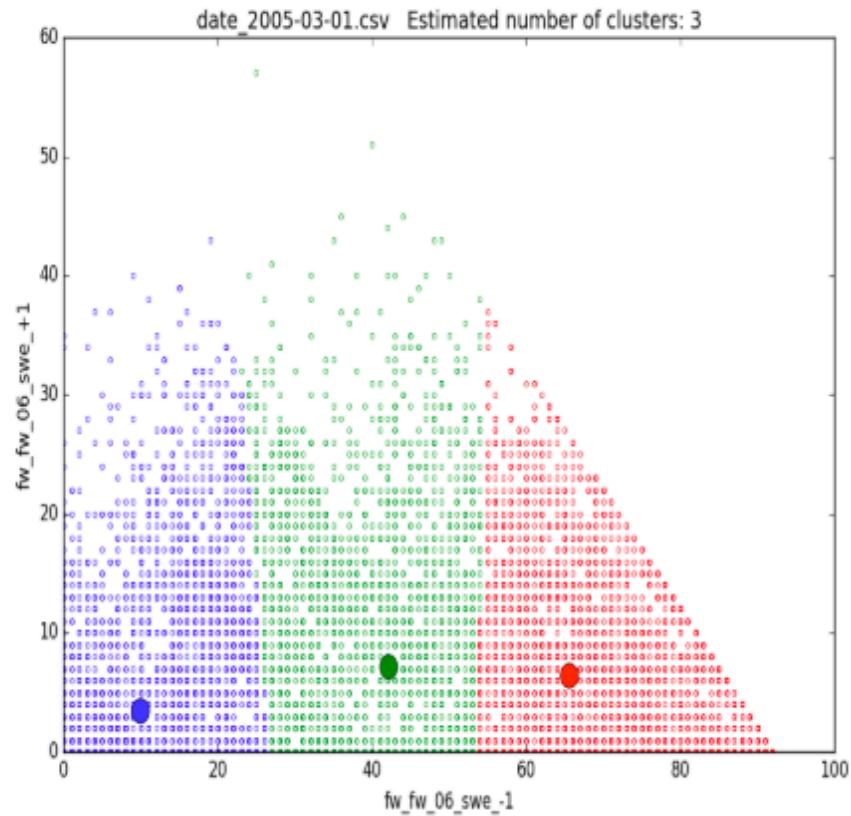
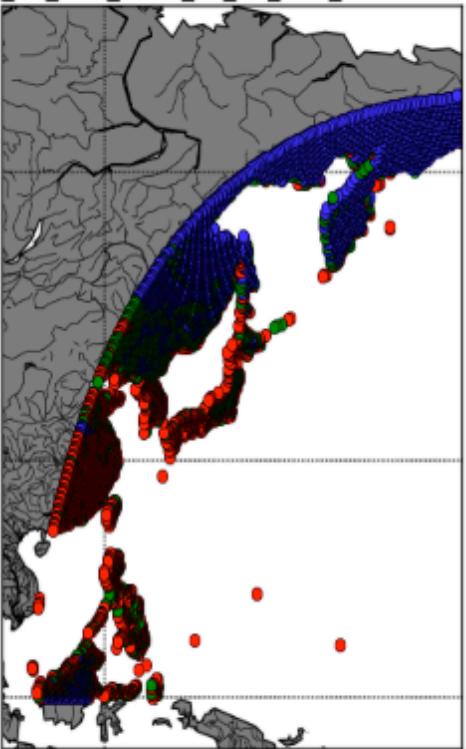
Click to add text



date_2005-09-01.csv 34 variables Estimated number of clusters: 2

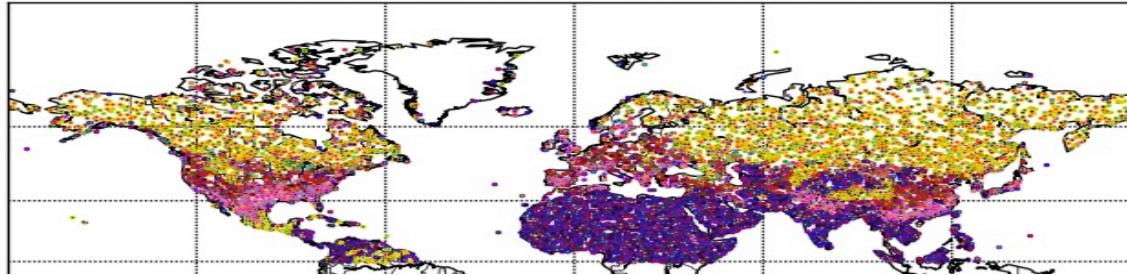


2005-03-01.csv fw/fw_06_swe_-1 fw/fw_06_swe_+1 Estimated number of clu:

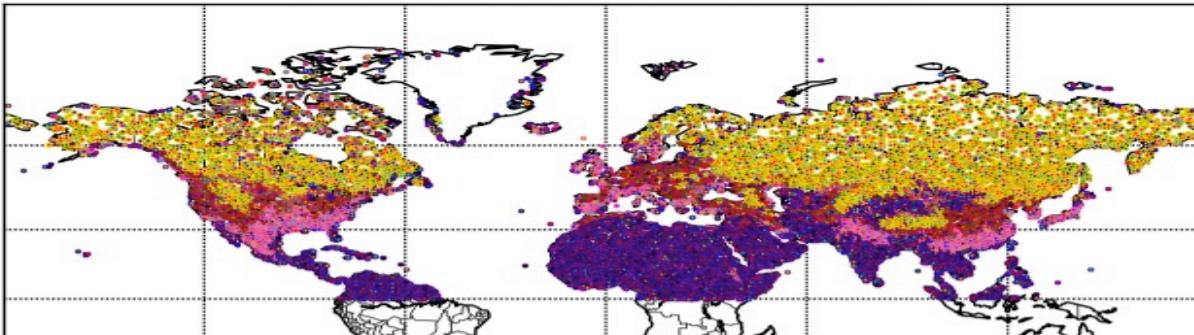


BaseMap in Python : compare different samples

map_P0.05_N1_Q0.1_V[ALL]_C10_sample_1991-12-01.jpg
Estimated number of clusters: 9

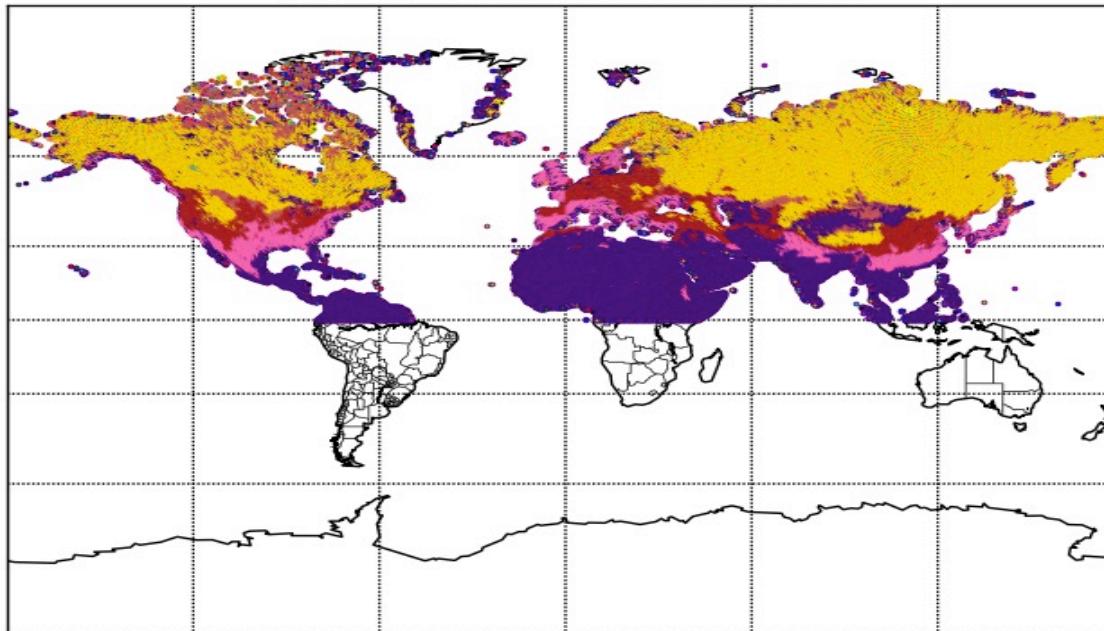


map_P0.1_N1_Q0.1_V[ALL]_1991-12-01_C7.jpg
Estimated number of clusters: 7

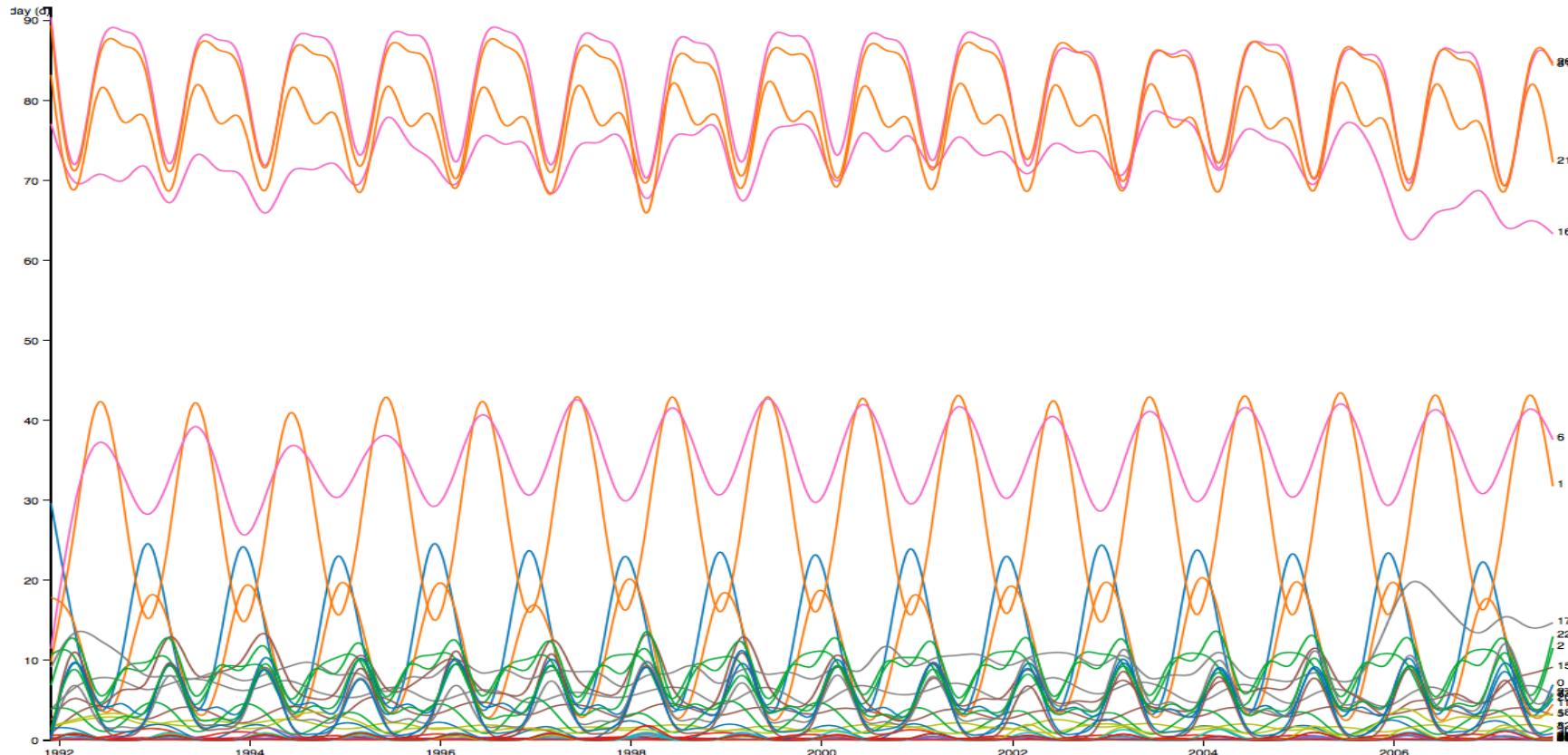


uSING All DatA :

1991-12-01_C7.jpg
Estimated number of clusters: 7



Use D3



Variables changed by seasons

We try to find out how variables changed by seasons, and by years.

Find out: some variables change dramatically by different seasons.

Such as ft_thawed and fw_06_swe_-1 has similar changes. Have high points and low points on different seasons.

Some does not change much over years.

Such as energy_lw_dn_-2, energy_lw_dn_+1

Change in same season

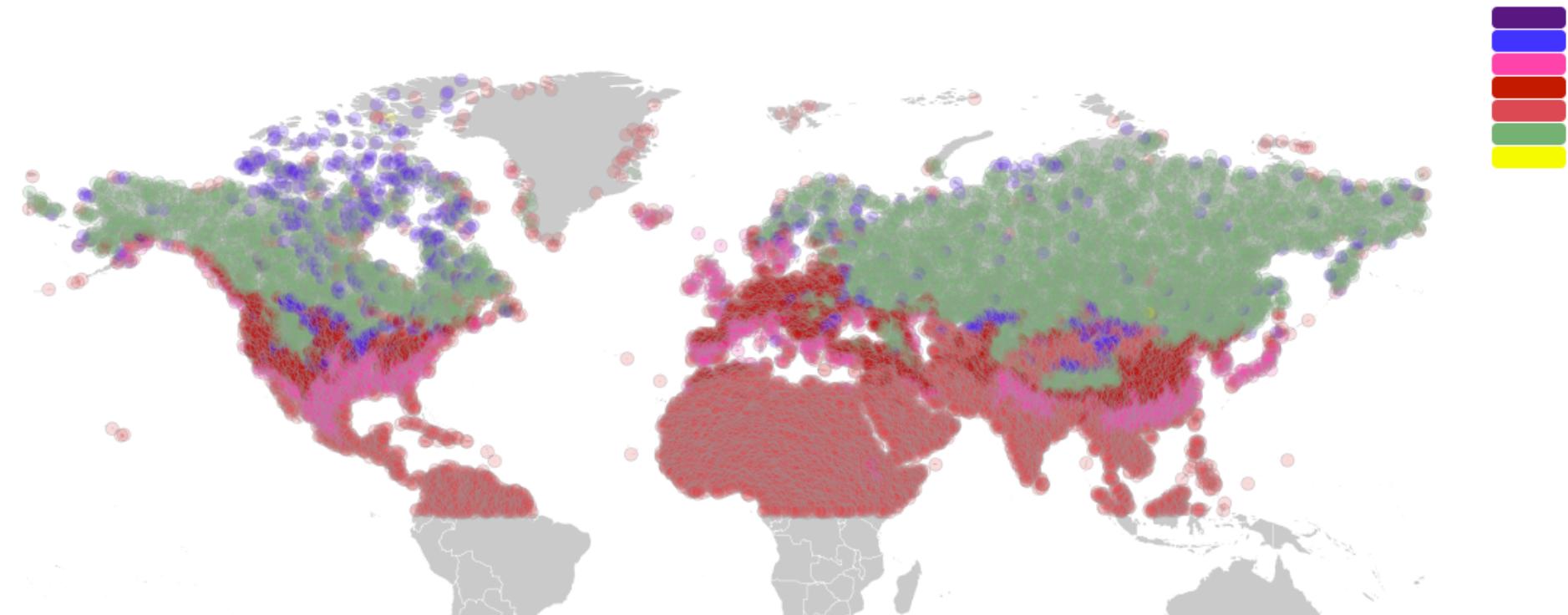
Summer has more clusters than other seasons.

Use D3

Date : 1991-12-01

Estimated number of clusters : 7

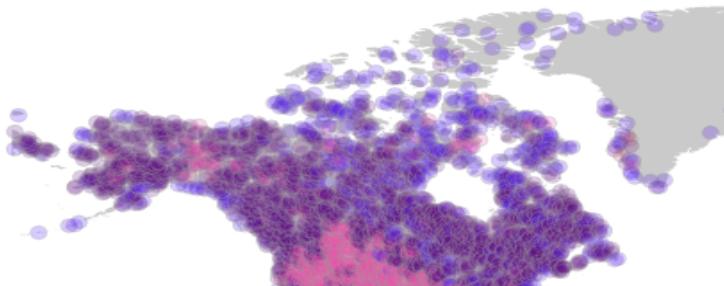
Change by : All seasons



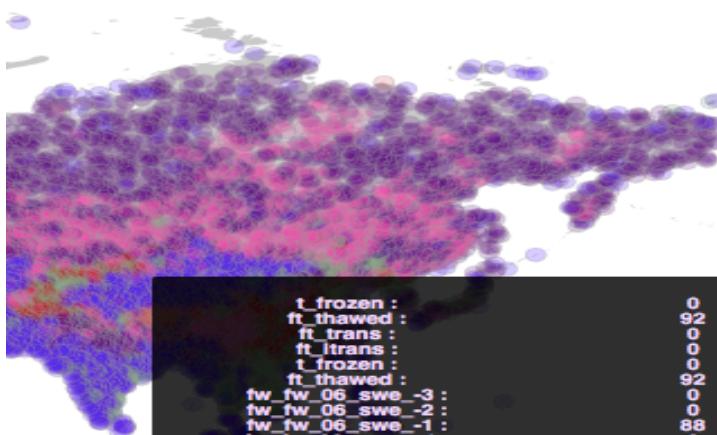
Date : 2006-06-01

Estimated nu

Change by : All seasons



t_frozen :	0
ft_thawed :	80
ft_trans :	9
ft_ltrans :	3
t_frozen :	0
ft_thawed :	80
fw/fw_06_swe_-3 :	1
fw/fw_06_swe_-2 :	16
fw/fw_06_swe_-1 :	58
fw/fw_06_swe_+1 :	8
fw/fw_06_swe_+2 :	0
swe_swe_average_-3 :	0
swe_swe_average_-2 :	0
swe_swe_average_-1 :	0
swe_swe_average_+1 :	0
swe_swe_average_+2 :	0
energy_sw_up_-3 :	0
energy_sw_up_-2 :	1
energy_sw_up_-1 :	52
energy_sw_up_+1 :	10
energy_sw_up_+2 :	23
energy_sw_dn_-3 :	0
energy_sw_dn_-2 :	8
energy_sw_dn_-1 :	84
energy_sw_dn_+1 :	0
energy_sw_dn_+2 :	0
energy_lw_up_-3 :	0
energy_lw_up_-2 :	0
energy_lw_up_-1 :	91
energy_lw_up_+1 :	1
energy_lw_up_+2 :	0
energy_lw_dn_-3 :	0
energy_lw_dn_-2 :	0
energy_lw_dn_-1 :	83
energy_lw_dn_+2 :	0



t_frozen :	0
ft_thawed :	92
ft_trans :	0
ft_ltrans :	0
t_frozen :	0
ft_thawed :	92
fw/fw_06_swe_-3 :	0
fw/fw_06_swe_-2 :	0
fw/fw_06_swe_-1 :	88
fw/fw_06_swe_+1 :	0
fw/fw_06_swe_+2 :	0
swe_swe_average_-3 :	0
swe_swe_average_-2 :	0
swe_swe_average_-1 :	0
swe_swe_average_+1 :	0
swe_swe_average_+2 :	0
energy_sw_up_-3 :	0
energy_sw_up_-2 :	0
energy_sw_up_-1 :	87
energy_sw_up_+1 :	4
energy_sw_up_+2 :	1
energy_sw_dn_-3 :	0
energy_sw_dn_-2 :	10
energy_sw_dn_-1 :	81
energy_sw_dn_+1 :	1
energy_sw_dn_+2 :	0
energy_lw_up_-3 :	0
energy_lw_up_-2 :	0
energy_lw_up_-1 :	87
energy_lw_up_+1 :	5
energy_lw_up_+2 :	0
energy_lw_dn_-3 :	0
energy_lw_dn_-2 :	0
energy_lw_dn_-1 :	87
energy_lw_dn_+2 :	0

lat: -128.15723 lon: 69.82767
cluster : 0

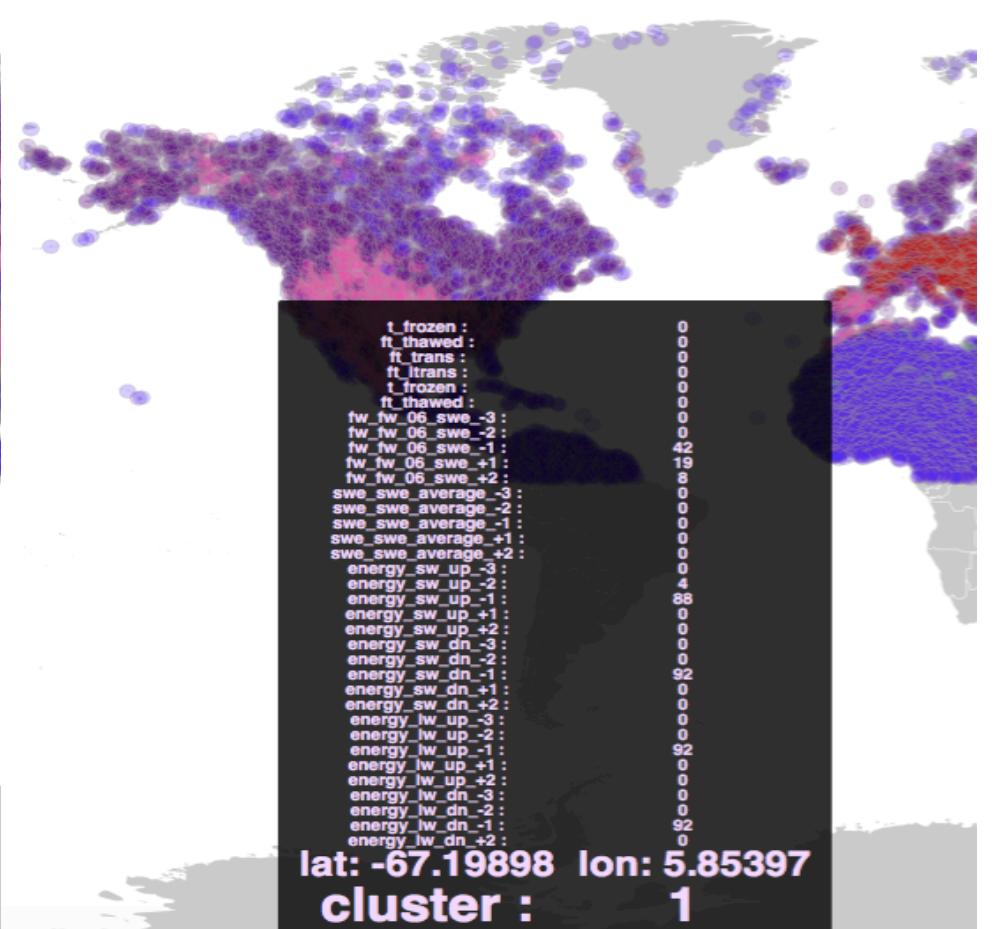
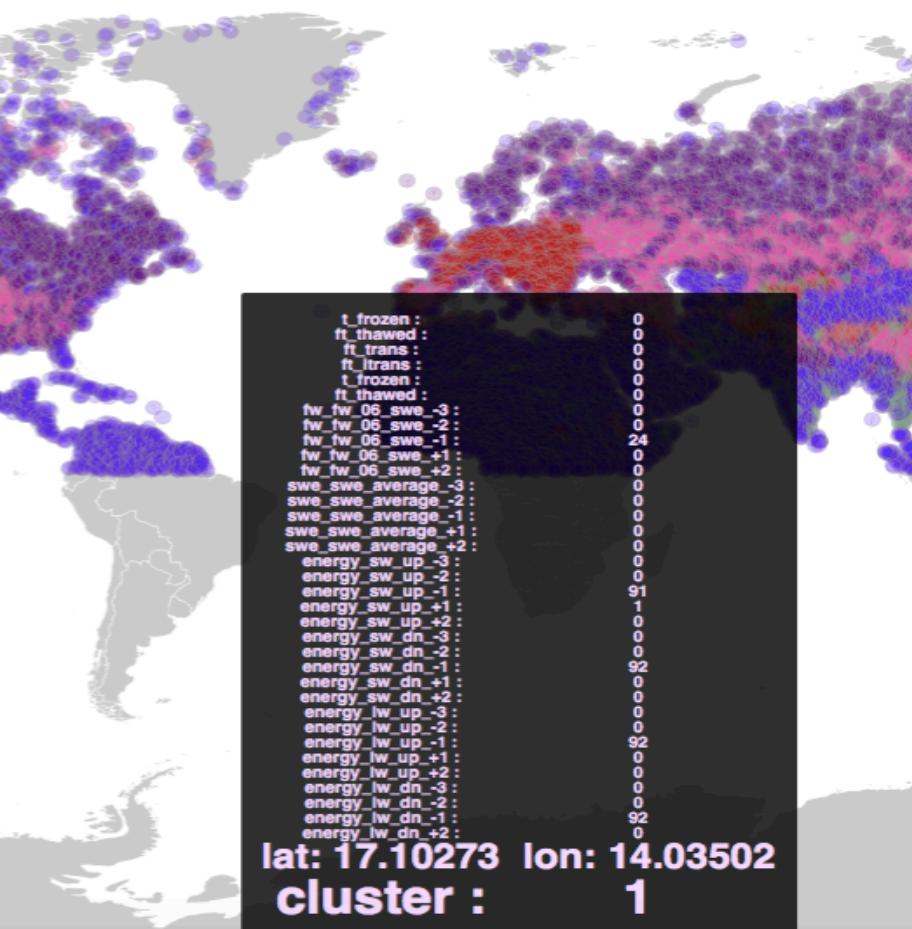
lat: 148.34872 lon: 70.57528
cluster : 0

Estimated number of clusters : 6

Change b

Date : 2006-06-01

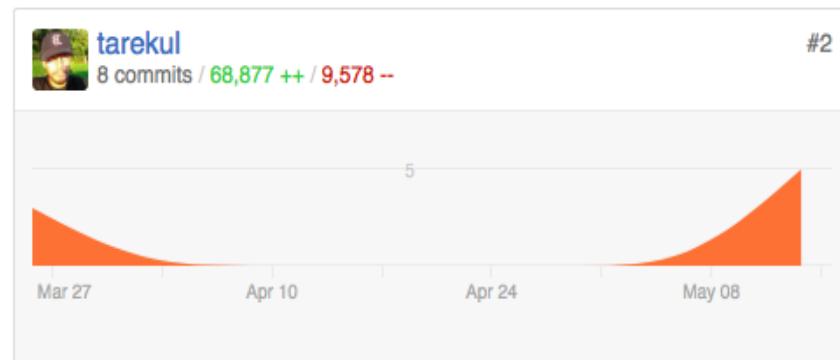
Estimated number of clusters :



Mar 27, 2016 – May 17, 2016

Contributions: **Commits** ▾

Contributions to master, excluding merge commits



Commits? Statistics