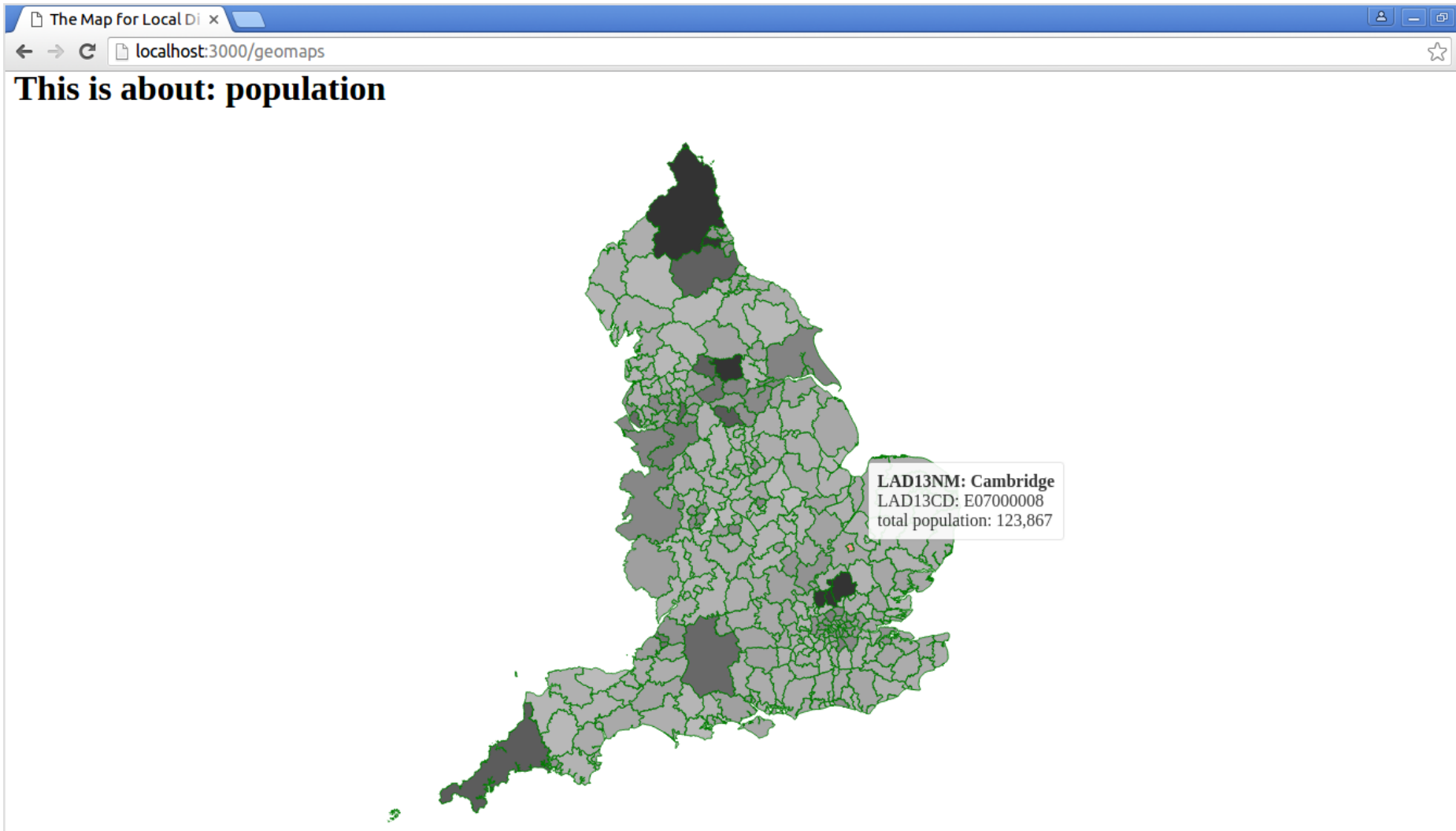
THE (FLOODED) ITALIAN JOB

Alessio Gottardo
Daniel Shamoa
Tommaso Benacchio

FloodHack, ECMWF, 17 January 2016

How it all started



Tools: Javascript (d3.js, node.js)

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LDAs plot on Mercator map of England - threshold-based color filling

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Tabular finer info through tooltip

IDEA

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Available info + model with data

IDEA

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$$\Downarrow$$

IDEA

Available info + model with data

Automating tool for decision and warning

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Available info + model with data

Automating tool for decision and warning

SMS to flooded people e/o ONGs etc.

1. FETCHING THE DATA


The dream you can't escape ALIVE!
NIGHTMARE
FROM THE MAN WHO TERRIFIED YOU IN "DAWN OF THE DEAD" & "FRIDAY THE 13th"!*
DAVID JONES Presents A GOLDMINE PRODUCTION
Starring SHARON SMITH • BAIRD STAFFORD and introducing C.J. COOKE
Also Starring MIK CRIBBEN • KATHLEEN FERGUSON • Produced by JOHN L. WATKINS
Written & Directed by ROMANO SCAVOLINI • Music by JACK ERIC WILLIAMS
Executive Producer DAVID JONES
*Special Effects Director TOM SAVINI
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21st CENTURY
"NIGHTMARE"

Queries on rasdaman web service

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Struggling to filter available data, e.g. to take out ranges, subsets...

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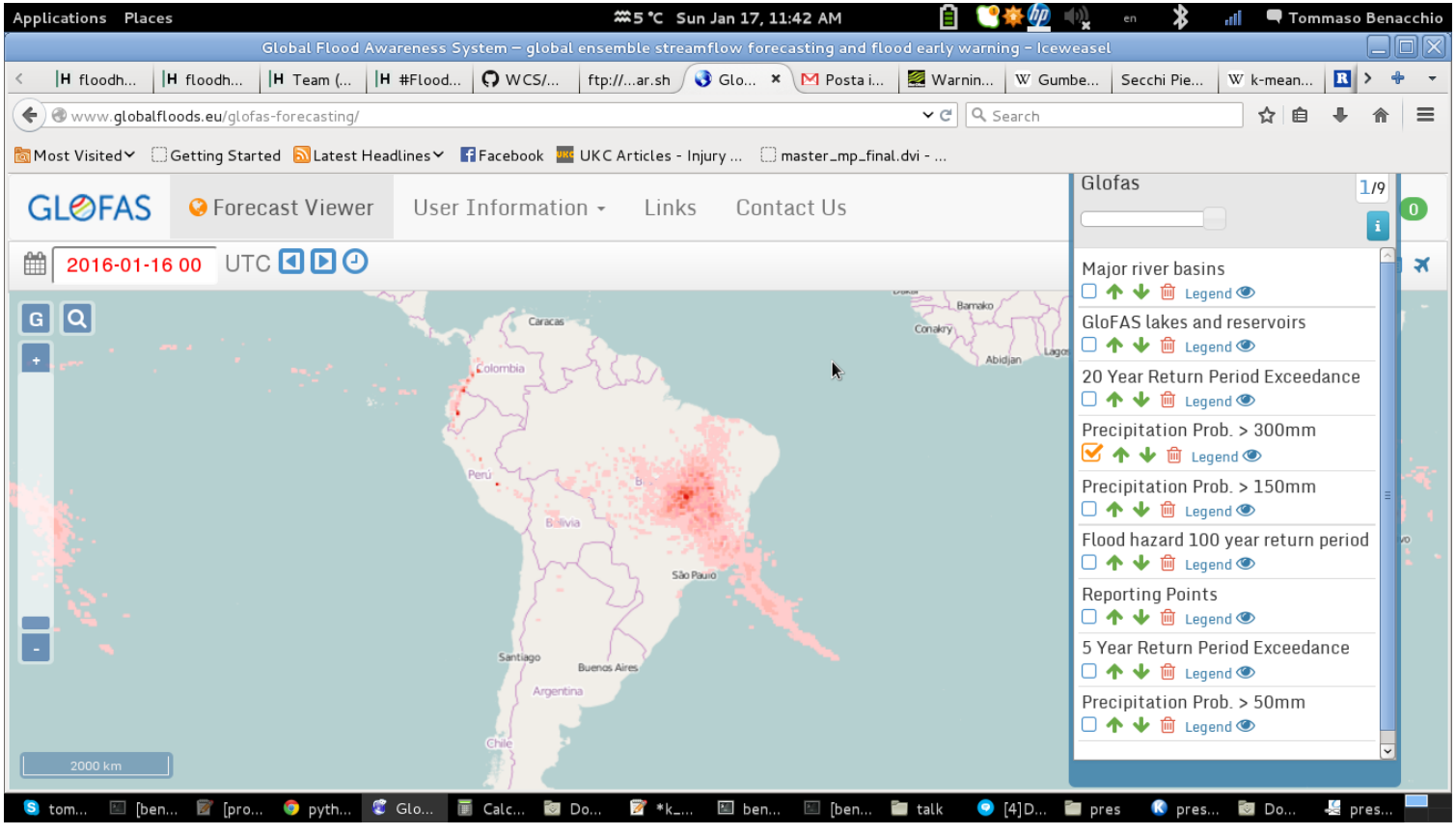
Trials with Panoply, netcdf going nowhere...

Solution: lowering expectations!



Fixed rainfall threshold all over the world!

Smaller data sets, simple measurements, no server queries

DEVELOPMENT

Fetching from rasdaman 2m temp and total ppn for a given time interval and a region (eg a nation)

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```
url_fmt_tp = 'http://incubator.ecmwf.int/2e/rasdaman/
ows?service=WCS&version=2.0.1&request=ProcessCoverages
&query=for c in (%s) return encode(c[Lat(%f:%f),
Long(%f:%f), ansi("%s" :  "%s")], "csv") '

url_tp = url_fmt_tp % ("TP", 50.0, 51.0, 1.0, 2.0,
"2014-12-20T00:00:00+00:00", "2014-12-30T00:00:00+00:00")
```

DEVELOPMENT

Organize data in numpy array

```
 def stuff(url_to_process):
# fetch the data
r = requests.get(url_to_process)
# clean the data
r.raise_for_status()
data = np.array(eval(r.text.replace('', '[').replace('', ']')))
print(data.shape)
# build the data structure
final = []
for col in range(data.shape[0]):
for row in range(data.shape[1]):
final.append([(np.arange(max_lat, min_lat - 0.5, -step)[row],
np.arange(min_long, max_long + 0.5, step)[col]),
data[col][row]])
matrix = np.array(final)
# sort and return the data structure
sorted_matrix = sorted(matrix, key=lambda x :  x[0][0])
return sorted_matrix
```

DEVELOPMENT

From Python, call R clustering function k-means

```
 base = importr('base')
stats = importr('stats')
# R to py suff
from rpy2 import robjects
from rpy2.robjects import pandas2ri
from rpy2.robjects.packages import importr
R = robjects.r
KM = R.kmeans(data_t2m_tp, 10)
centers = np.array(KM.rx2('centers'))
clusters = np.array([np.array(KM.rx2('cluster'))]).T
```

DEVELOPMENT

Plotting data on lat lon grid

```
 complete_data = pd.concat([data_frame, pd.DataFrame(clusters,
columns=['cluster_id'])], axis=1)
#stuff = pandas2ri(data_frame)
plt.scatter(x=data_t2m_tp.ix[:,0], y=data_t2m_tp.ix[:,1],
c=complete_data.ix[:,4])
plt.show()
#R.points(data_lat_long, col = KM.rx2('cluster'))
plt.scatter(x=data_lat_long.ix[:,0], y=data_lat_long.ix[:,1],
c=complete_data.ix[:,4])
plt.show()
```

TO BE DONE

Output: new individual thresholds as means of centroids of the clusters

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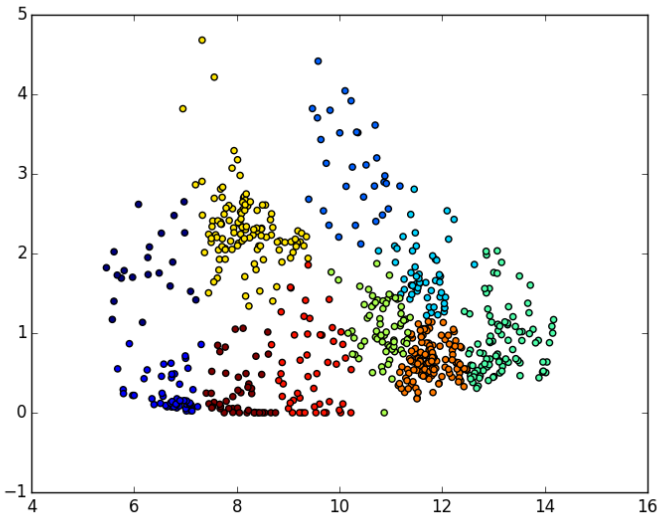

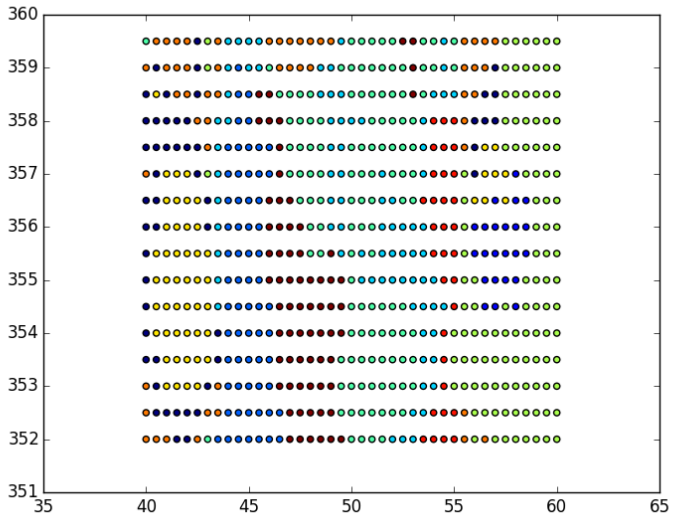

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Feeding the new thresholds back to the node.js app and show data on d3.js map

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Interface with SMS-sending service to people, NGOs etc. for warnings