THE GLOBE PROGRAM
Globe Virtual Student Conference

Did the Fire Aggravate the Flood?

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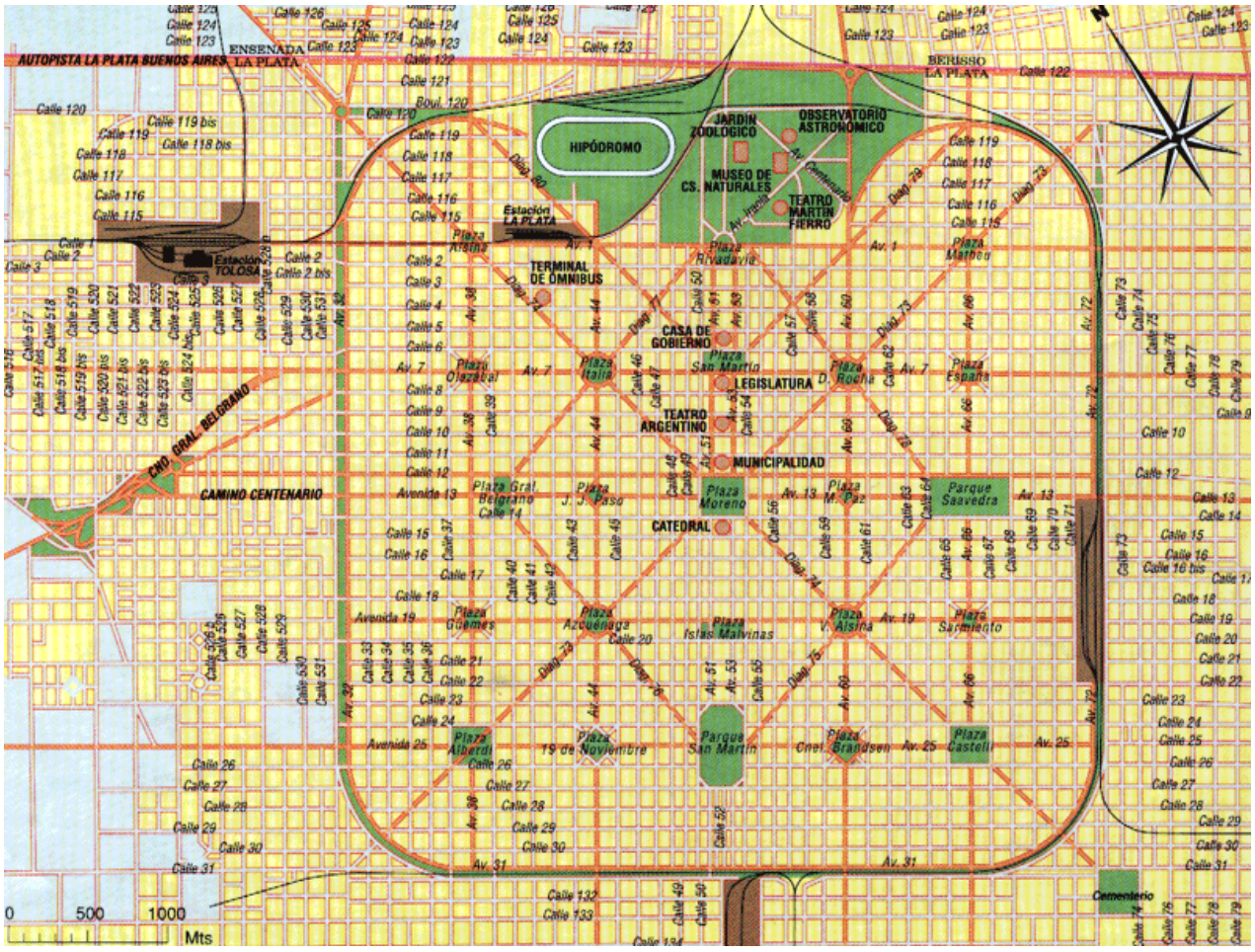
Abstract

The purpose of our project is to analyze the causes, human and natural ones, of the floods in the city of La Plata during the past April 2nd. Apart from determine the natural and human causes of the floods, our research question has to do with finding out if the fire in a distillery near the city had something to do with the severe floods. We worked with atmosphere protocol and gather information in situ and from the internet. We found that the lack of waterworks, intense rainfall and high demographic growth in the last ten years are the main causes of the flood. We could not state the relation between the fire and the flood in a clear and unquestionable way.

La Plata is the capital city of Buenos Aires province, in Argentina. It is located over the Pampa Húmeda, 56km in the south-east of Buenos Aires city, the capital of Argentina, at 34° 55′ south latitude and at 57° 17′ west longitude. It covers a surface of 940,38 km2 and it is at 9,87 meters over sea level. It has around 560,000 inhabitants, with a density of 585,2 per km2. Its climate is warm, with an annual average temperature of 16,3°C and annual average precipitations estimated in 1,023mm.

La Plata City Plan



La Plata City Plan - (1)

Satellite image of the city of La Plata

The floods in the city seen from a satellite image (9)

During April 2nd and 3rd , rain fell over La Plata, Buenos Aires, with severe consequences. Along with this, there was an important fire in YPF distillery plant, located in the outskirts of the city, the same day the rain started falling . What prompted our research was the need of finding out if such a tragedy was only due to natural causes, or if there were human actions that led to it as well. In order to answer fullfil our aim of finding the answer to that question, we read about the issue in local newspapers, and we found several articles about a fire in YPF distillery. We also made in situ observations and worked with the Atmosphere Protocol. The information gathered led us to formulation of our research question, that is:

Did the fire in the distillery aggravate the flood in the city of La Plata?

Fire in the distillery

Beginnings of the fire in YPF distillery – Ensenada – La Plata (2)

Fire seen from the city

Fire seen from the city of La Plata

In order to answer those questions we must first take into account the following facts, resulting from the analysis of the information available:

- The storm rapidly caused the accumulation of water in streets and houses located in a neighbourhood called West Row, and later on in most of the city.
- It had never rained so much in this southern Argentinean city. The 181 millimeters that, according to official data, fell during 7 hours between Monday and Tuesday flooded multiple neighborhoods and resulted in 51 casualties.

Our hypothesis of why the floods had such tragic consequences for the city are the following ones:

1) Construction over the channels. Not only the plains have been edificated but also the channels of the glens.

2) Concentration of rain. The storm mainly happened in the urban nucleus, transforming the avenues into channels.

3) Drainage to the outside. The water flowed to the outskirts flooding the lowest houses in the area

4) Sudestada. It's the Spanish name for a climatic phenomenon in the Río de la Plata. It consists on a quick rotation of cold winds from south to southeast, saturating polar air masses with ocean moisture. The cold winds that penetrate into the zone of the River Plate, following the direction of the river, make temperature to remain low and stationary for several days. The abrupt change in temperature gives origin to precipitations of different intensity, and makes the water of the river increase its level over the coast of Argentina, producing floods in the lower regions.

Apart from the causes mentioned above, we think that the fire in YPF distillery might have some connection with the intensity of the tragic flooding.
The enterprise informed to local newspapers that the fire was produced in the middle of the climate phenomenon, due to an extraordinary accumulation of rainwater and a blackout in the whole complex (4 and 5).

Some journalists state that YPF was forced to close the gates of a channel that goes through the interior of the distillery in order to avoid the rise in the level of water. That channel goes through the city centre of La Plata's city. Thus, the water came to the city rather than to the river. In addition there is clear evidence of pollution with oil in different points of the city, also in the outskirts of the area of the distillery.

The data to carry out the research consisted on:
-observations in situ made by one of the students of the team
-atmosphere protocol, to measure precipitations
-web sites (newspapers, local and government sites)
-bibliography

The amount of precipitation fallen was, according to the National Weather Service, of 181mm, on April 2nd, from 18.00 to 21.00 hs, the most intense part of the storm, being the only rain gauge used by this organism located in the airport, several kilometers away from the city centre.
On the other hand, the rain gauge of the University Observatory measured 392mm all over the storm (4 hours approx.). (6)

The rain gauge used by one of the students in the research was located in the center of La Plata, and it indicated 370mm of precipitation from 18.00 to 23.00 on April 2nd.

Conclusion

After working with the Atmosphere protocol and after our research, we could identify some of the causes of the floods:

-the lack of waterworks and drainage channels, as the only public works in the city in the last five years had to do with street lighting and paving. (7)

-sudden and violent climate events, with a precipitation of at least 180mm in less than 3 hours.

-a high level of constructions in flood areas and in the borders of Del Gato and Maldonado streams in La Plata.

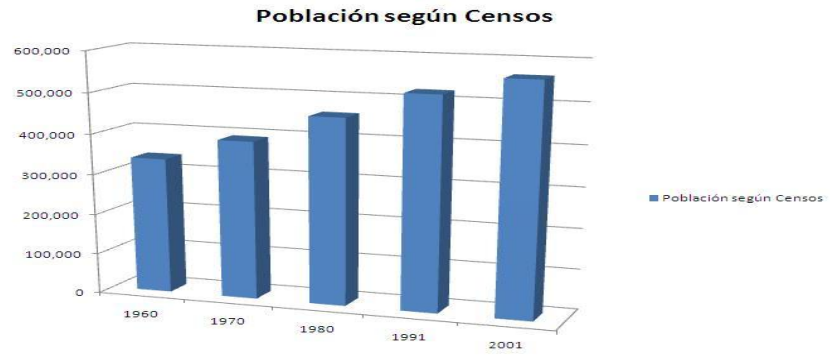
As regards the fire in the distillery we do not have enough evidence to state that it aggravated the floods.

Discussion

Possible improvements to be done to the Project would be to take into account some other variables, such as:

-climate change
-lack of environmental conscience
-garbage and other waste blocking gutters and drains
-deforestation and illegal land clearing in certain zones in the north of the country, not allowing water absorption in the River Plate basin, channeling water in low areas and causing flooding.
-the demographic growth in La Plata in the last ten years, related to the lack of public works.

Population according to demographic surveys



Population growth between 1960 and 2001 (8)

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