



Big data analysis of climate change risk and an insurance policy

Prof. Ionut Purica

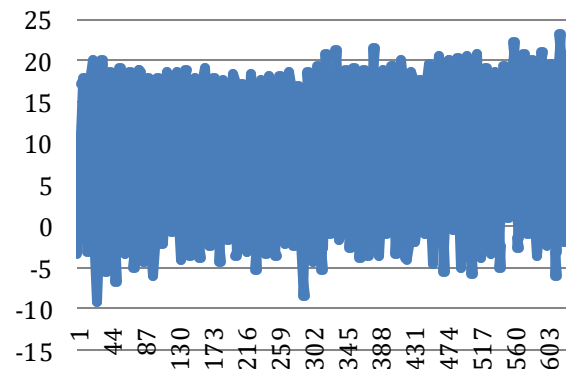
15.Feb.2023

Big data analysis of climate parameters and risk maps – Romania example

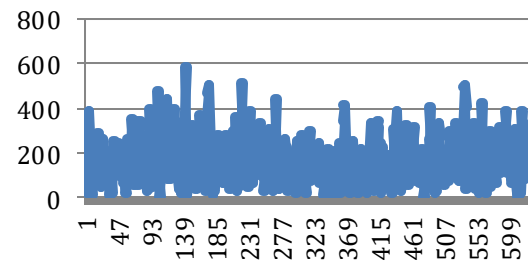
The change of the climate is characterized by the increase in temperature and a larger standard deviation of the temperature distribution. Having the data of temperature for each of the 40 regions of Romania on a monthly basis in time, starting 1961, a two fold analysis was done: first, with the purpose to check the evolution of the average temperature and of the associated distributions standard deviation and second, to assess the risks stemming from the combined effects of temperature and precipitation in each region that result in flood and drought and snow and freeze risks.

Big data analysis of climate parameters and risk maps – Romania example

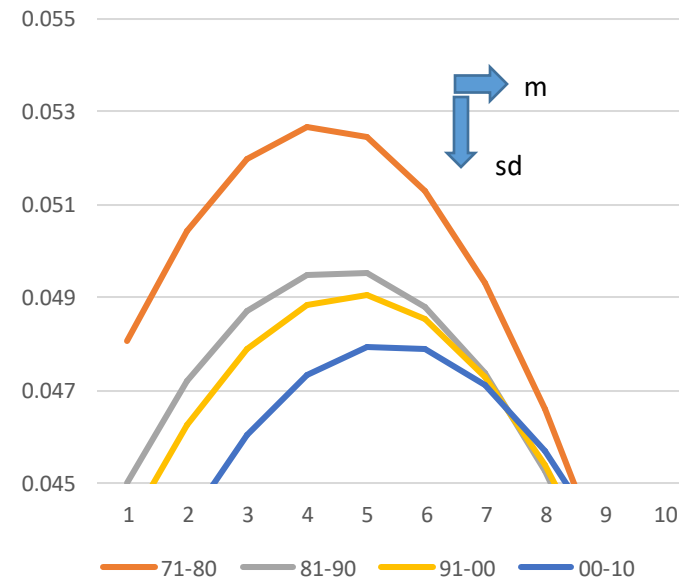
Arges county temperatures
Jan.1961-Dec.2013 [°C]



Arges county
precipitations
Jan.1961-Dec.2013
[l/m²]

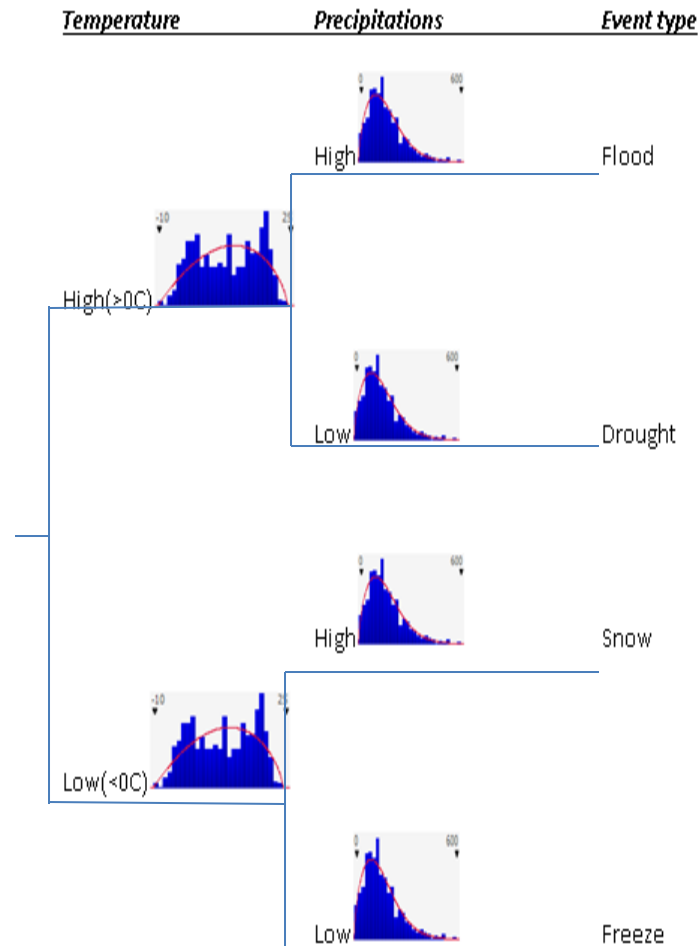


Temperature distribution by decades
Romania, Prahova county

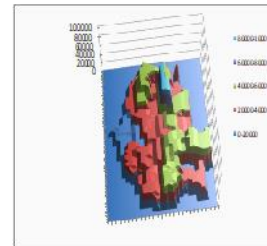
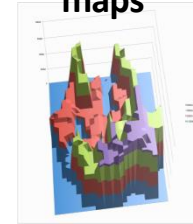


Big data analysis of climate parameters and risk maps – Romania example

Event tree for Climate change events

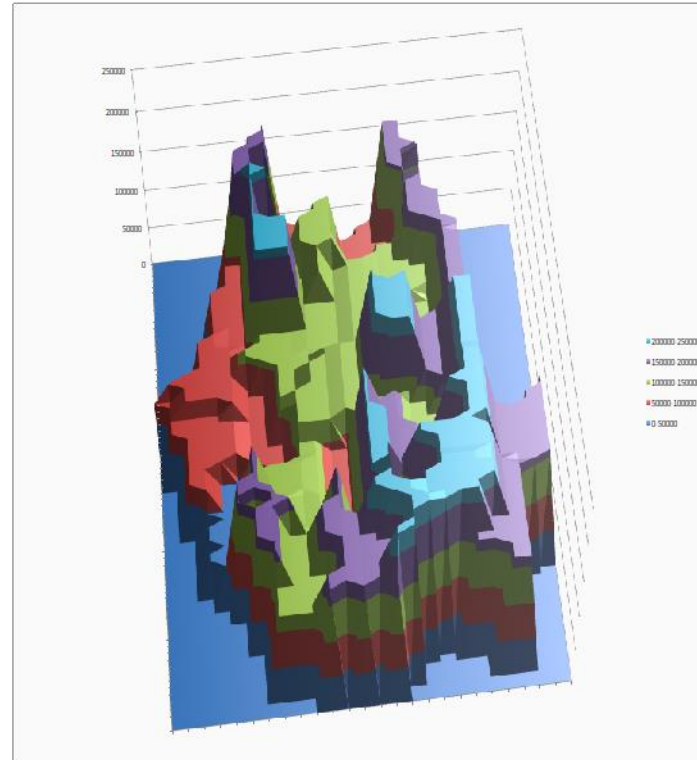


Risk maps



Insurance policy against climate change

Total CC events risk map [thousands US\$]

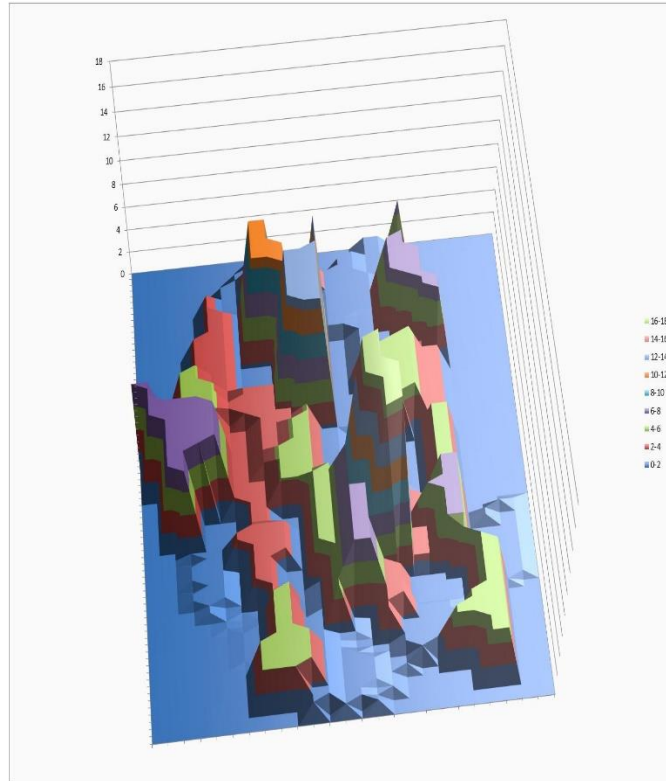


distribution of risk premium per capita

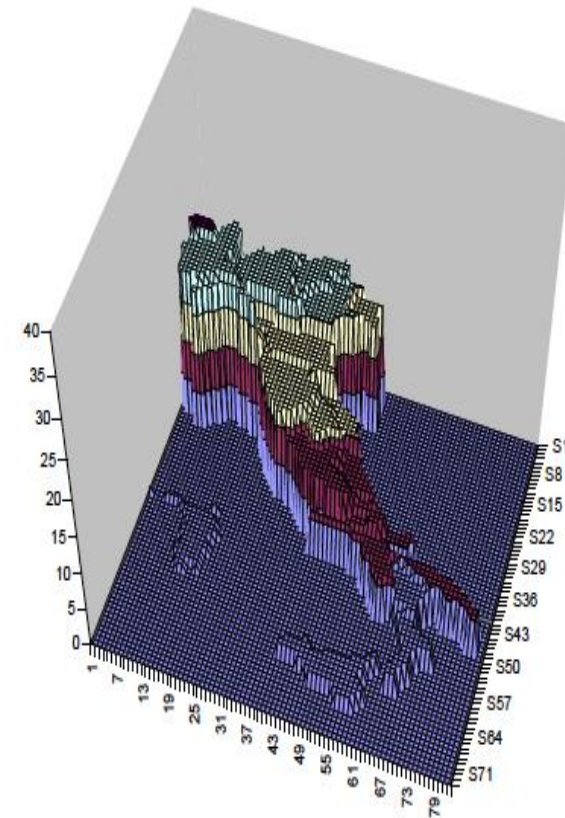
County	Premium Risk /cap US\$	County	Premium Risk /cap US\$
Bucuresti	0	Harghita	19.68
Alba	17.05	Hunedoara	8.44
Arad	11.81	Ialomita	43.59
Arges	8.28	Iasi	12.27
Bacau	8.33	Ilfov	6.68
Bihor	8.43	Maramures	8.31
Bistrita Nasaud	27.29	Mehedinti	32.56
Botosani	20.53	Mures	11.32
Braila	35.06	Neamt	11.59
Brasov	12.96	Olt	21.09
Buzau	16.20	Prahova	11.77
Calarasi	40.17	Salaj	51.13
Caras Severin	8.74	Satu Mare	31.13
Cluj	8.77	Sibiu	17.69
Constanta	13.86	Suceava	5.13
Covasna	59.81	Teleorman	23.70
Dambovita	22.91	Timis	6.71
Dolj	9.90	Tulcea	36.61
Galati	20.83	Valcea	15.41
Giurgiu	46.07	Vaslui	22.73
Gorj	16.76	Vrancea	25.50

Impact on gas grids – distributed risk

Romania gas grid CC and mechanical risk [probable deaths/1000 cap]



Natural gas risk in Italy
[probable deaths / million inhabitants]





Thank you !

Prof.Dr.Ionut Purica

ipurica@gmail.com