

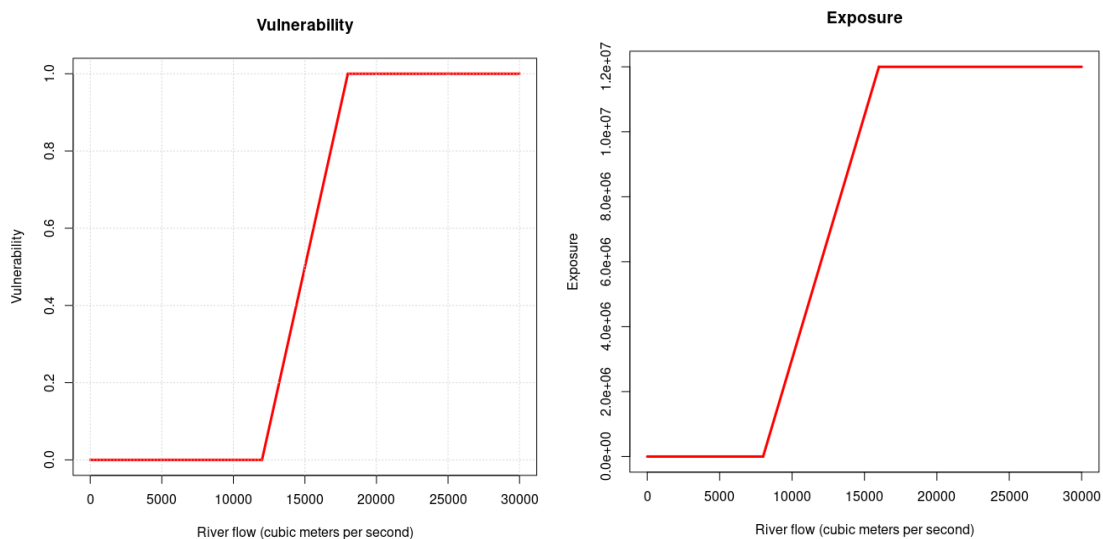
UNIVERSITY OF BOLOGNA
Climate change adaptation

Exercise – Computation of risk associated to a flood event

Annual maximum peak flows in m^3/s were observed for a river along 150 years. The data are reported in the text file maxann.txt.

The river is protected by levees, so that vulnerability is kept to 0 up to a river flow of $12.000 \text{ m}^3/\text{s}$. Then, vulnerability is increased linearly to 1 for a peak flow of $18.000 \text{ m}^3/\text{s}$.

The exposure of the floodprone area is null up to a river flow of $8.000 \text{ m}^3/\text{s}$. Then, exposure increase linearly up to a value of $12.000.000$ euros for a river flow of $16.000 \text{ m}^3/\text{s}$.



Compute and plot in a graph the risk associated to flood events for peak flow ranging from 0 to $30.000 \text{ m}^3/\text{s}$.

Compute the risk R by the relationship $R = P V E$, where P is computed with the Lognormal probability distribution. For each peak flow use the probability of not exceedance to estimate P and make a reasoning on the meaning of the obtained risk values. What do they mean?