Climate Risks and Adaptation

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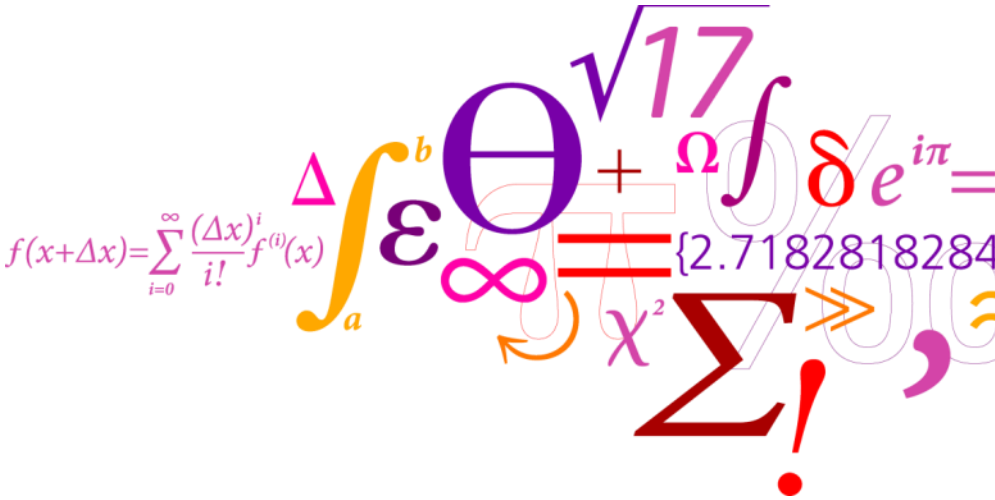
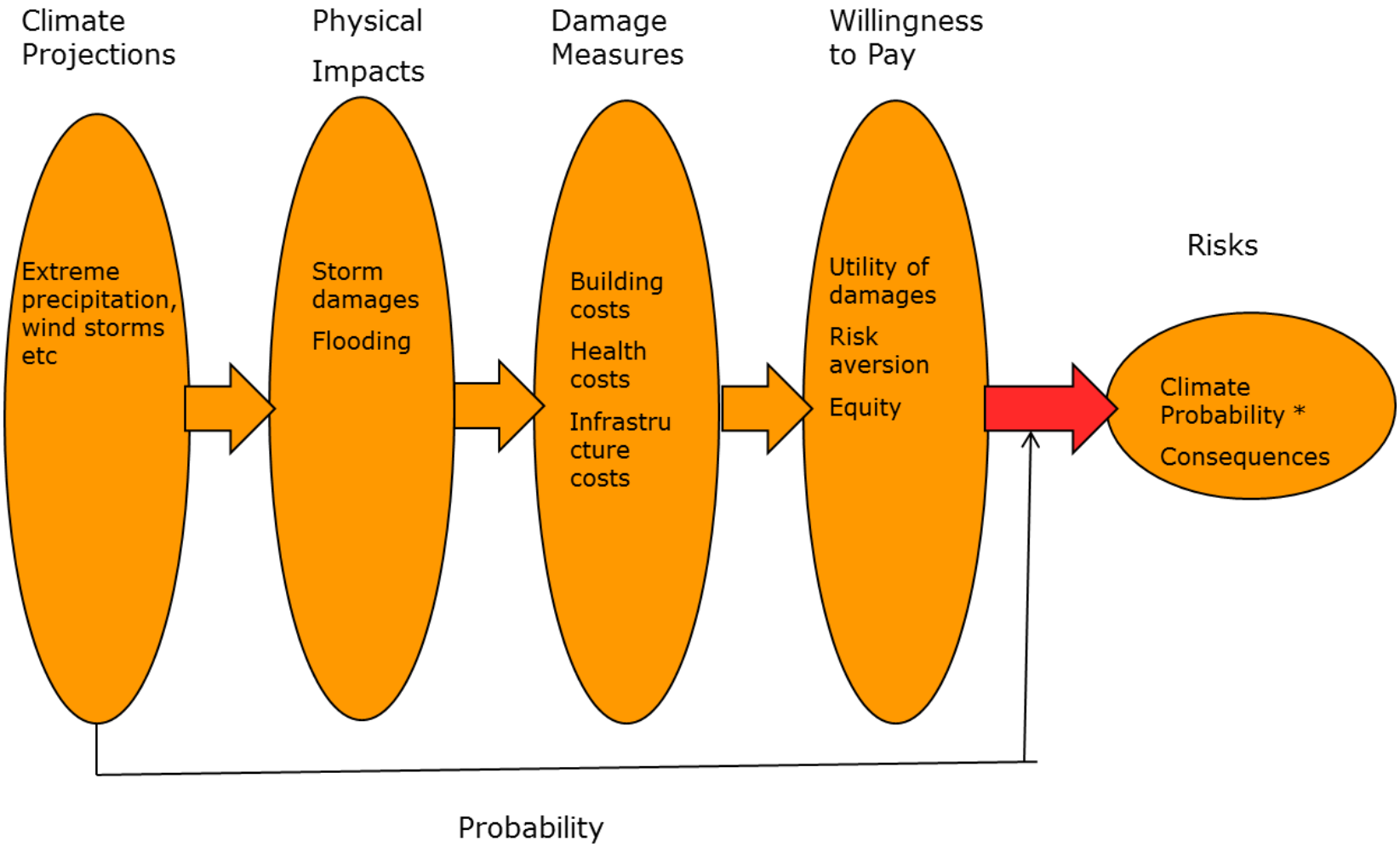
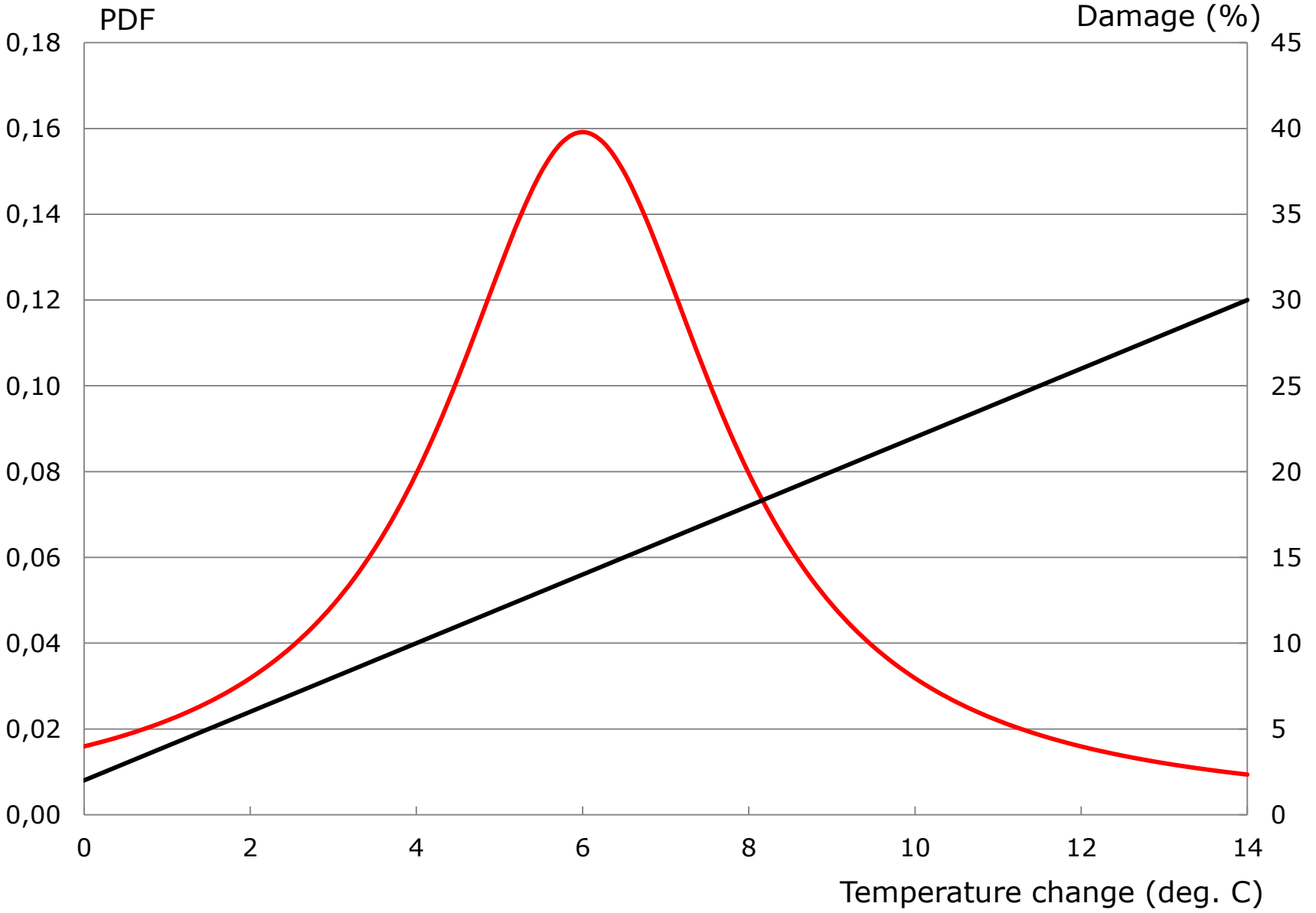


Approach

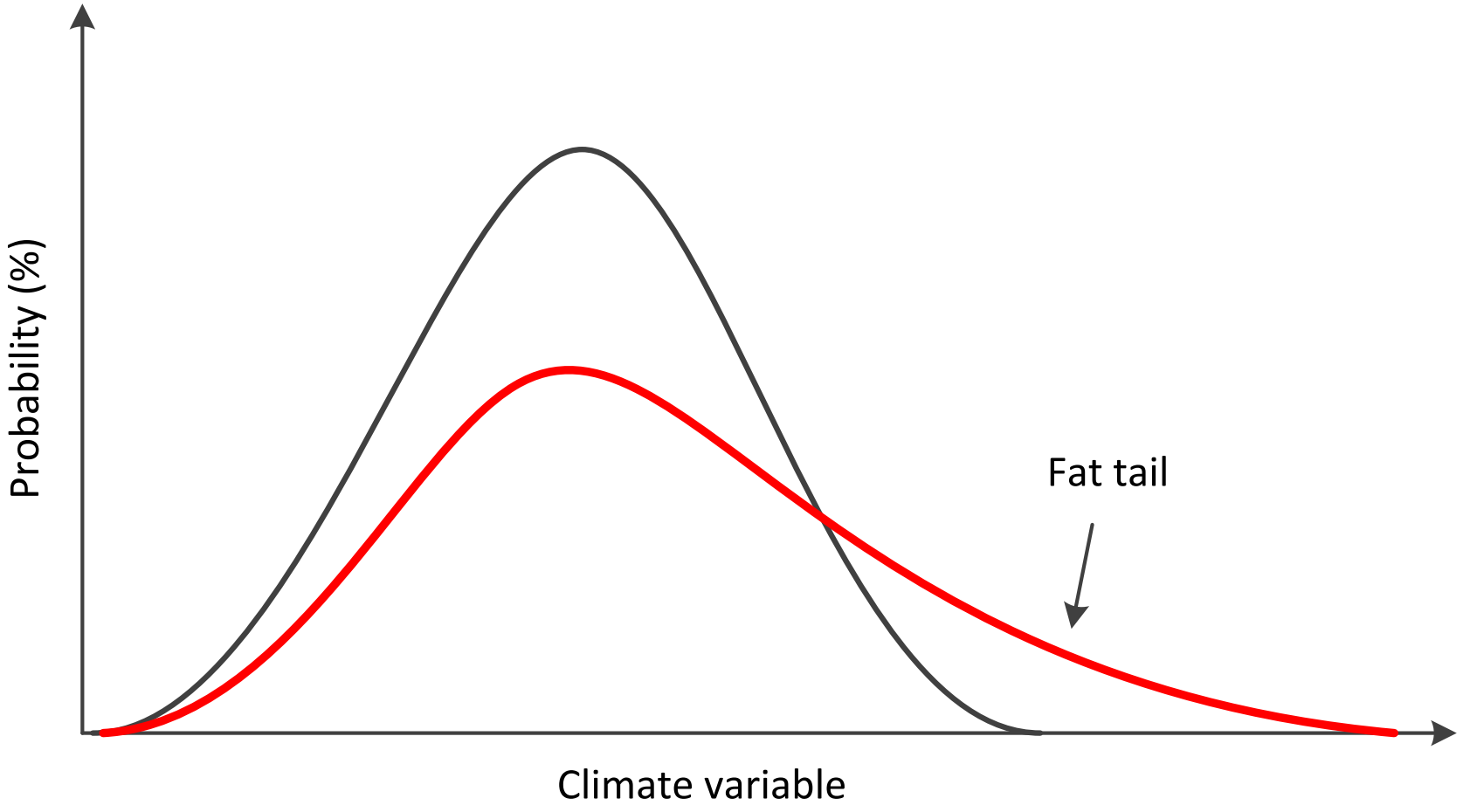
- Risks are considered for alternative climate change scenarios including 2 degrees, 4 degrees, and 6 degrees with a focus on events with extreme consequences
- Risks are defined as probability of climate events * consequences
- Alternative economic assumptions are applied:
  - Damage cost function
  - Risk aversion factor
  - Discount rate
- Flooding case study from extreme precipitation in the Danish city Odense
- Sensitivity analysis for climate scenarios and economic assumptions
- Conclusions in relation to decision making and on the demand for climate data


Climate Projections
Physical Impacts
Damage Measures
Willingness to Pay
Risks
Extreme precipitation, wind storms etc
Storm damages
Flooding
Building costs
Health costs
Infrastru cture costs
Utility of damages
Risk aversion
Equity
Climate Probability *
Consequences
Probability

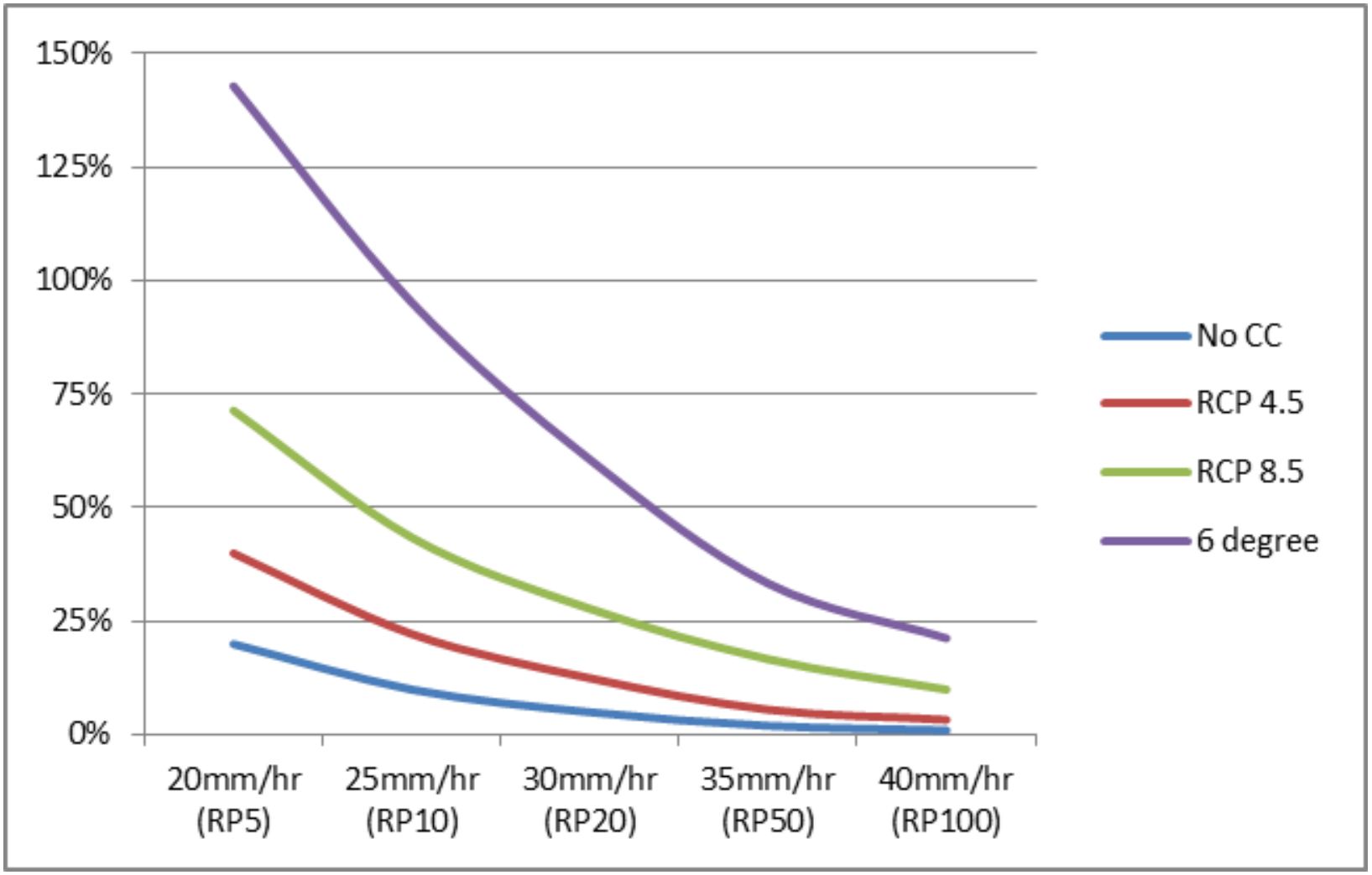
Risks: Probability * Consequence



Alternative Climate Variable Distributions



Annual Frequency of Flooding Events



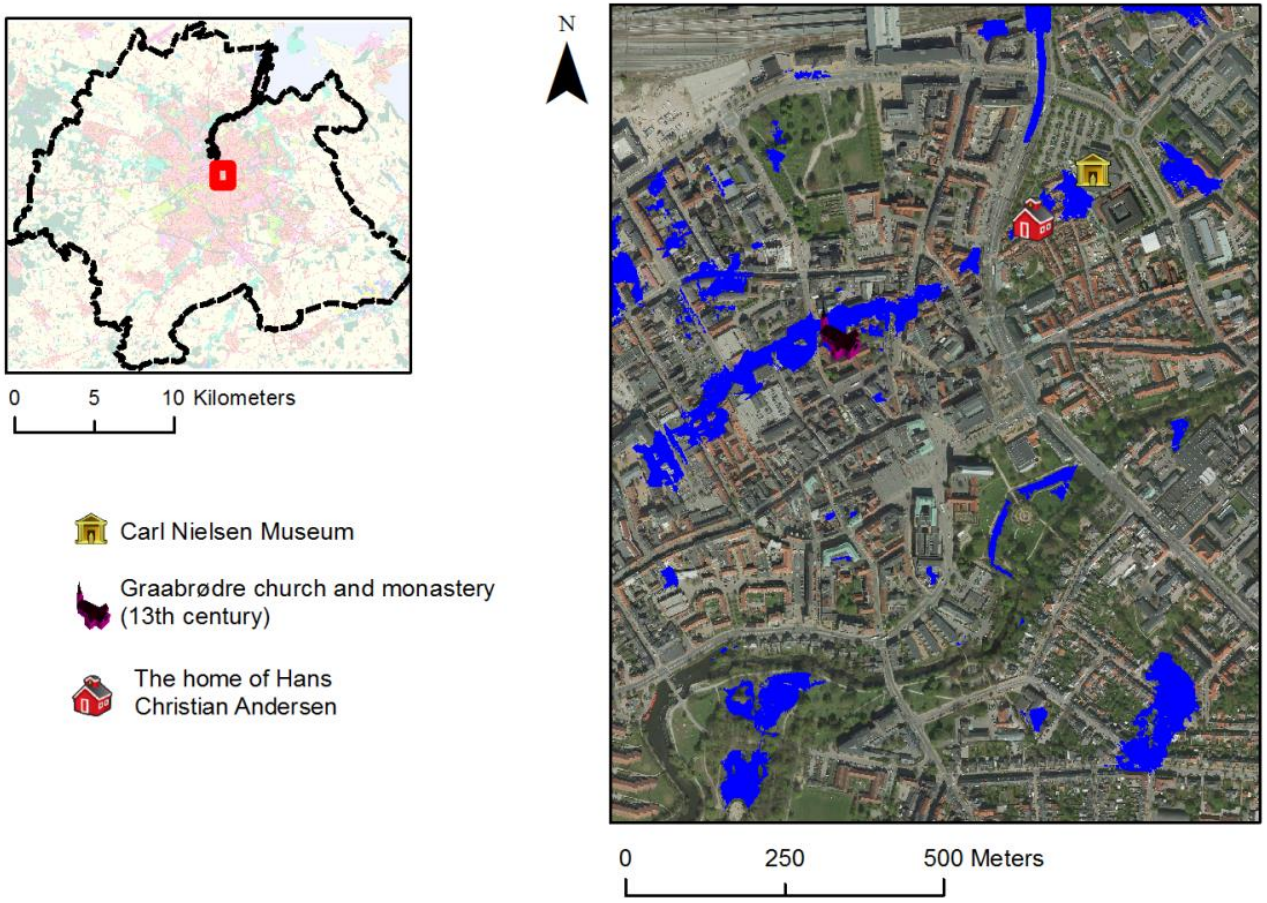
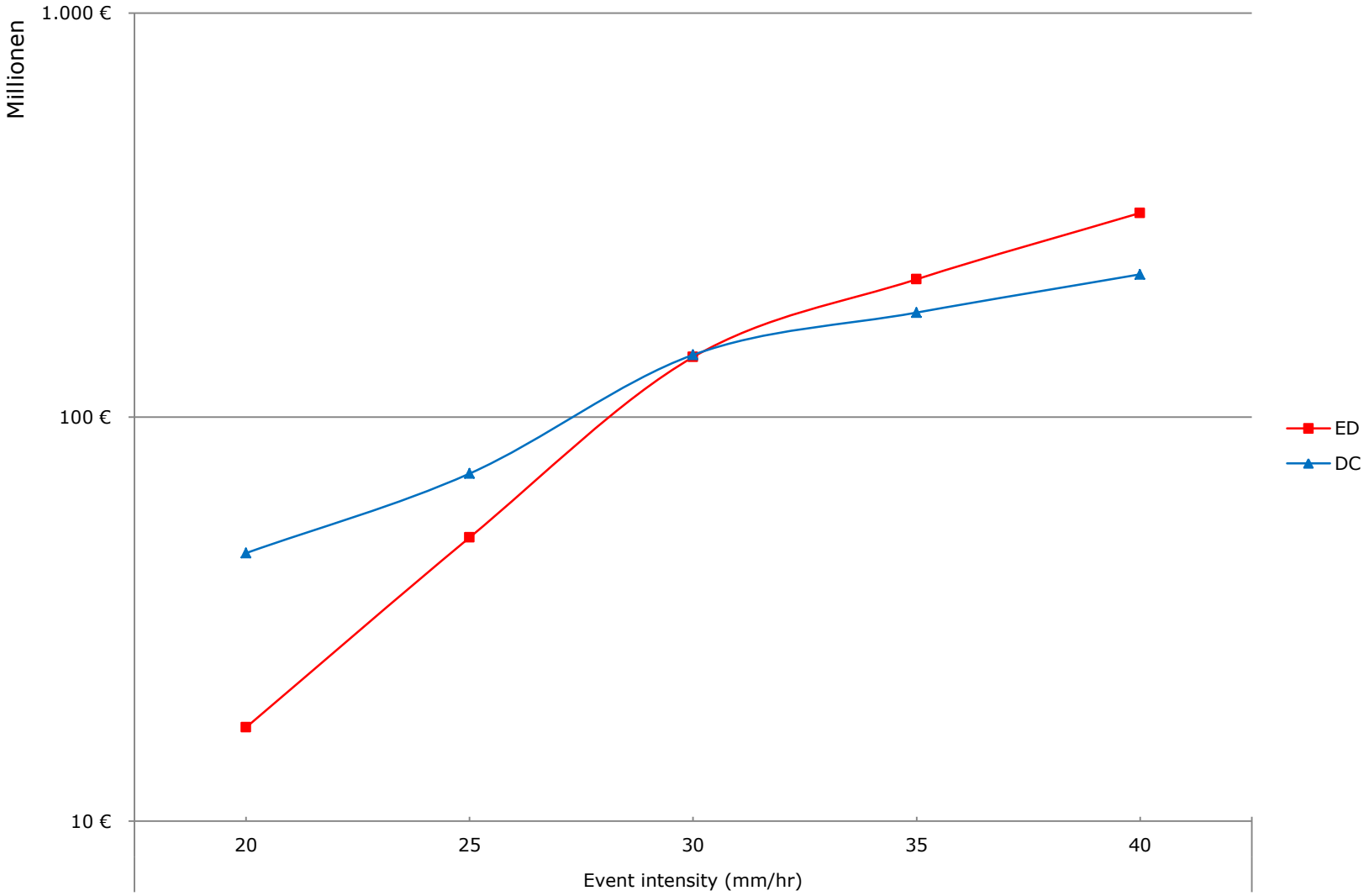


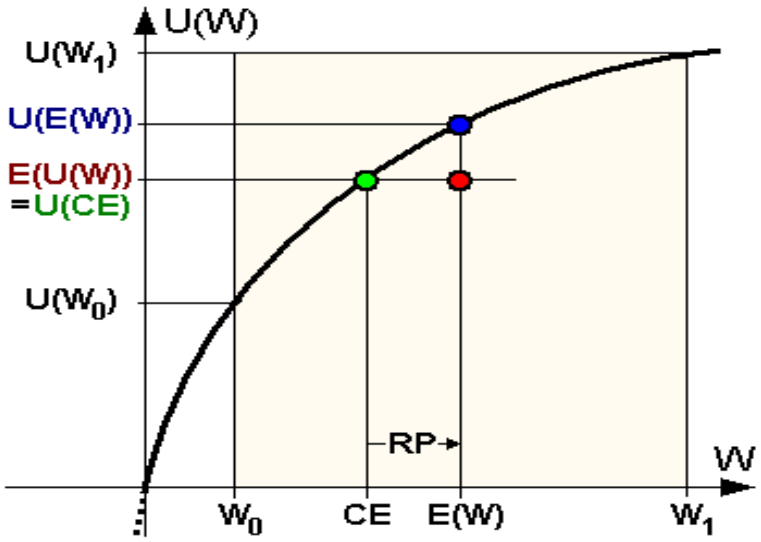
Figure 1: Location of key irreplaceable assets within city centre of Odense and flooded area during high-intensity rainfall event with a maximum intensity of 40mm/hr

Damage Cost Categories

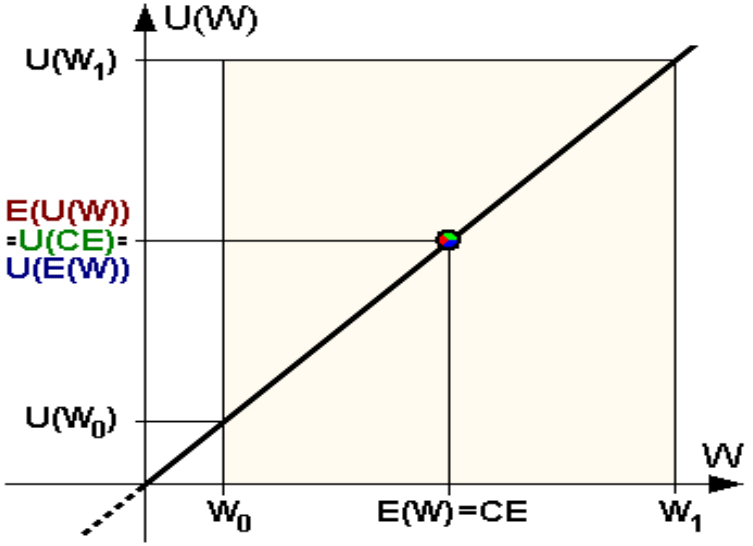
Flooding Damage Curves

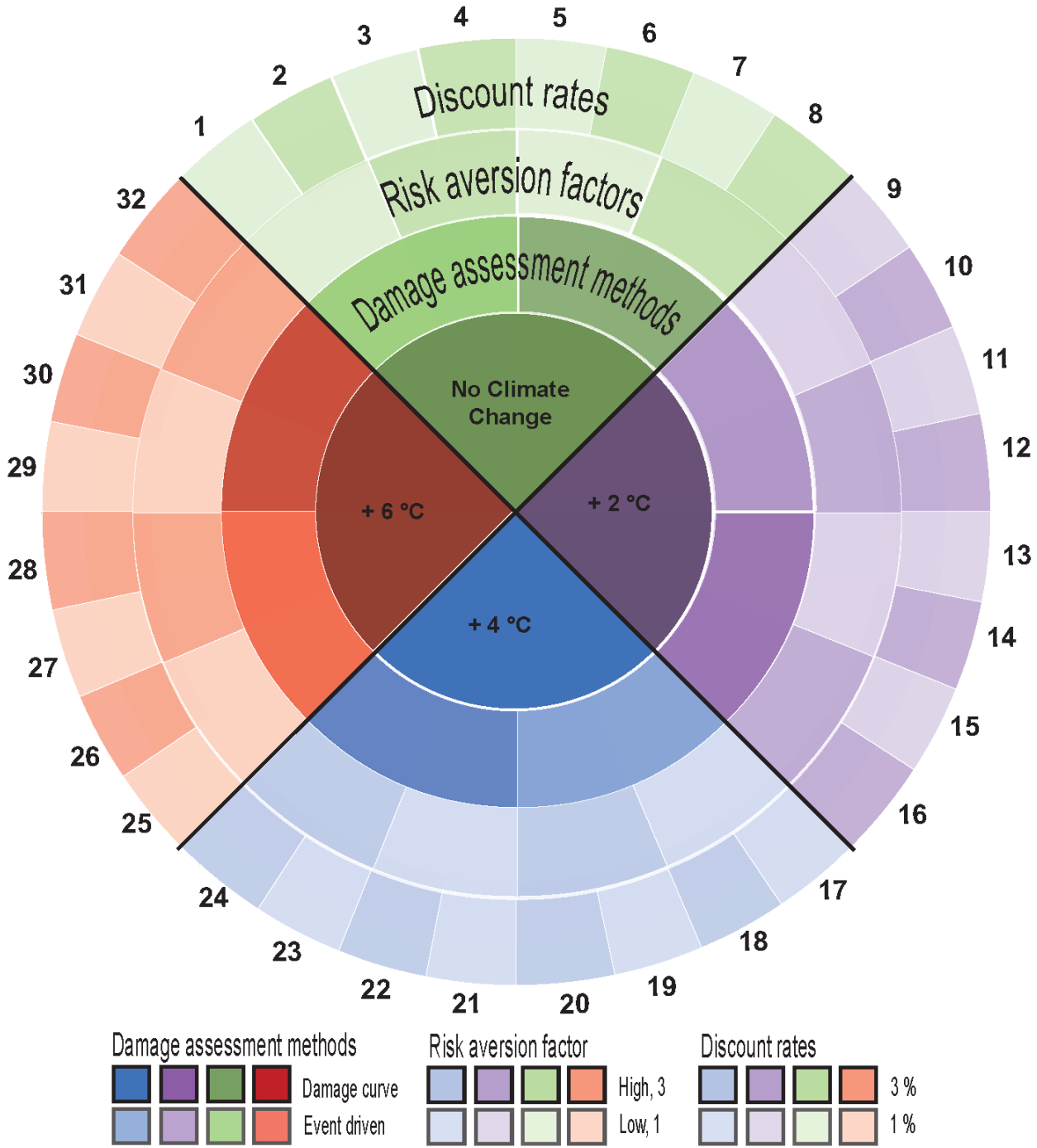


Risk Averse



Risk Neutral




Discount rates
Risk aversion factors
Damage assessment methods
No Climate Change
+ 2 °C
+ 4 °C
+ 6 °C
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
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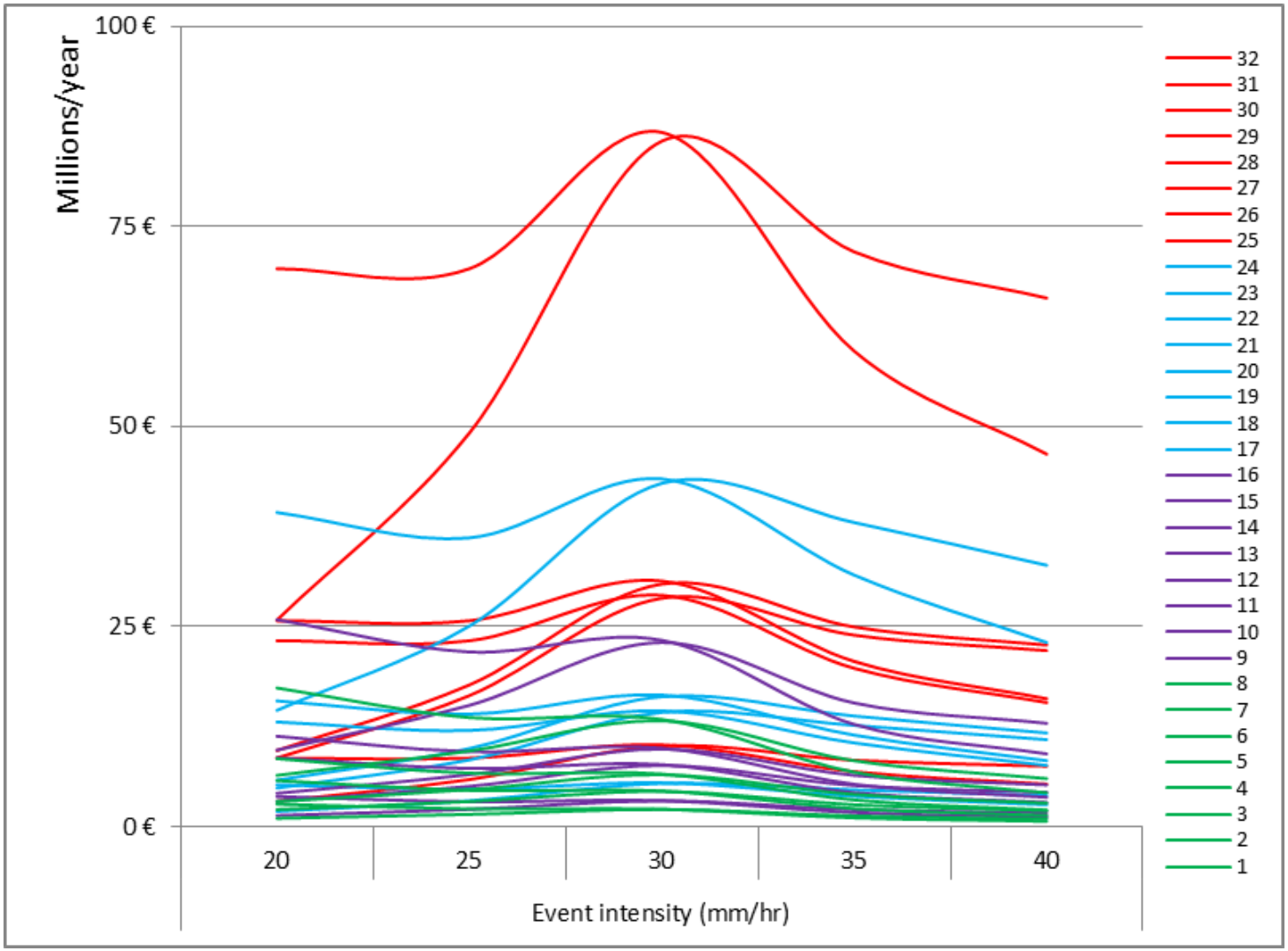
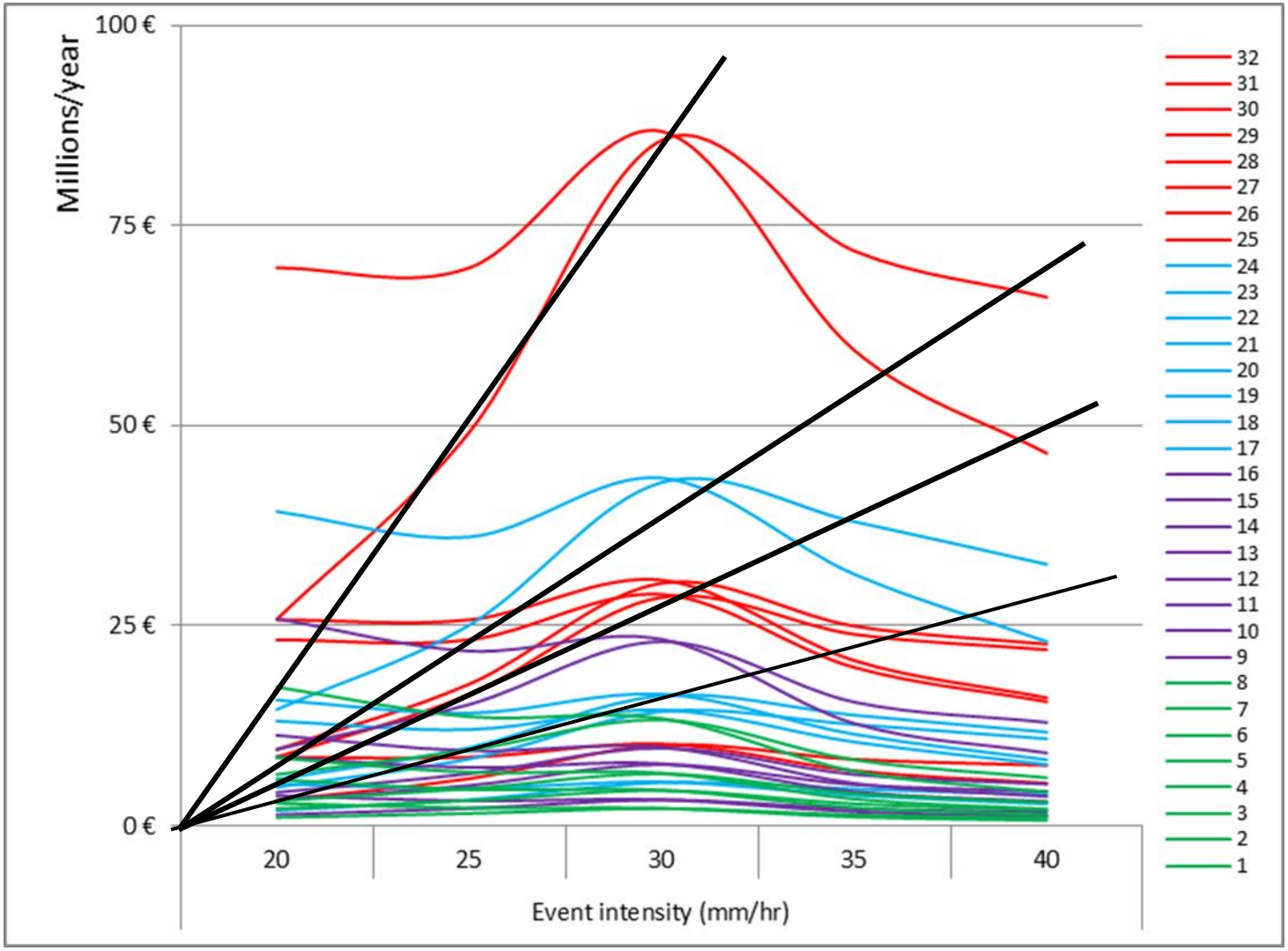
27
28
29
30
31
32
Damage assessment methods
Damage curve
Event driven
Risk aversion factor
High, 3
Low, 1
Discount rates
3 %
1 %

Net Present Value of All Combinations



No Change
2 Degree
4 Degree
6 Degree

Decision Making Perspective



Black Lines Illustrate Alternative Adaptation Cost Curves

Conclusions

- Climate scenarios for high consequence events are important to adaptation decision making – detailed regional medium term data is needed
- Economic assumptions in particularly related to risk aversion and discount rates are important in determining the climate change risk level – large variations are seen and risks vary with a factor of 6 for a 30 mm per hour event for a given climate scenario such as the 6 degree scenario
- Detailed adaptation cost studies will be usefull as an input to, where hig consequence climate scenarios should focus