

# INCREASING DAMAGES TO BUILDINGS – CLIMATOLOGICAL OR SOCIOECONOMIC CHANGES?

## STATISTICAL ANALYSES OF LOSS EVENTS

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The Intercantonal Reinsurance (IRV), the reinsurer of the Public Building Insurance Companies (PBIC) of 19 Cantons of Switzerland, documents an evident increase in *losses caused by natural hazards* (termed here *elementary losses*) over the last 25 years. Not only the *mean* of the annual losses is increasing distinctly, so does also the *variance*, as clearly indicated by the years 1999 and 2005 (**Fig. 1a**). It is crucial (for an insurance company) to understand the reasons and the future progress of this trend in order to have a basis for calculating upcoming insurance premiums and provisions. The development of damages to buildings is found to depend on socioeconomic as well as on climatological changes. The proportion of climatologically induced changes contributing to this increasing trend is unclear but is definitely becoming more important. The major determining factors of this increase are socioeconomic changes that took place over the last few decades: (a) buildings increased in number and value and (b) buildings become more vulnerable (b<sub>1</sub>) because they are built in more exposed areas, (b<sub>2</sub>) because of changes in used materials and types of construction and (b<sub>3</sub>) because of increased insurance claims of the insurants.

To establish effective prevention tools against elementary losses we first need to better understand the above mentioned loss relevant factors, namely the climatological and mainly socioeconomic changes. One approach focuses on trend analyses of past and recent elementary losses to get an instrument for estimating future losses. Detailed statistical analyses of loss events (damages to buildings) and natural phenomena (storm, flood, etc.) should lead to a possible correlation of the latter, and therefore to an information about trends of loss events and natural phenomena.

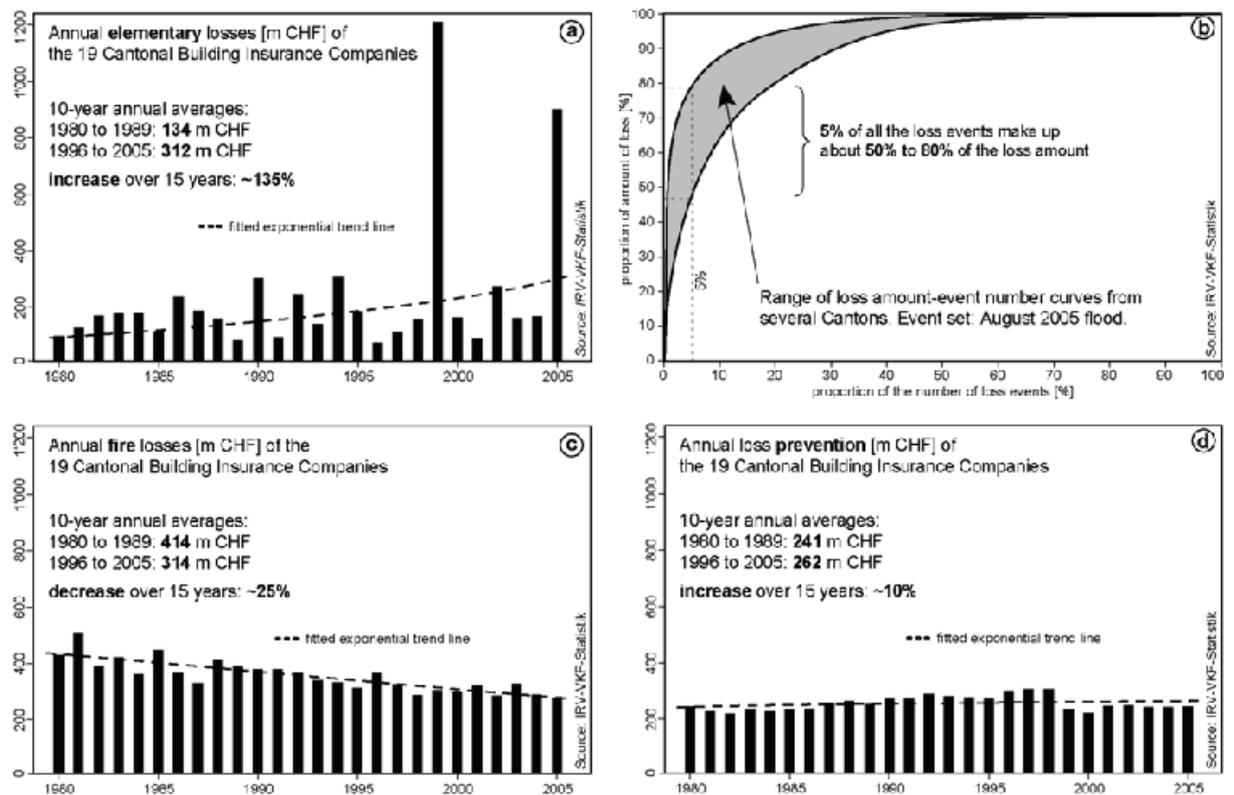
Another approach used by the IRV is performing detailed statistical analyses of single loss events. Several analysed events can be classified by natural hazards (storm, hail, flood, landslides, snow loads and avalanches) and types of buildings. First results show that a number of many small losses (single damages to buildings) are accountable for a very big part of the total loss (**Fig. 1b**). Five percent of all loss events in one Canton can make up 50 to maximum 80% of the total amount of loss for one particular event (e.g. August 2005 flood). In order to focus prevention and therefore avoiding a significant part of loss amount, the types of risks (types, locations and constructions of buildings) making up these 5% of loss cases have to be identified.

A detailed analysis of (single) loss events, regarding the socioeconomic factors, is the key to promote and induce efficient prevention measures. The comparison of annual elementary losses with fire losses of the 19 PBIC reveals a significantly different history (**Figs. 1a, c**): The 10-year annual average of elementary losses increased by roughly 135% between 1980

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and 2005 (accounting the two “decades” 1980-1989 and 1996-2005), whereas the fire losses *decreased* by approximately 25%. In the meantime, the expenses for loss prevention remained on a more or less stable level, amounting 260 million CHF/year during the last 25 years (**Fig. 1d**). A major part of these funds went into fire loss prevention and turned out to be a very effective investment representing a proof of the PBICs maxim “insure and prevent”. The exact proportion of how much of these investments went into elementary or fire loss prevention is unclear. However, the portion used for elementary loss prevention seems to have been not sufficient or effective respectively.

The ongoing statistical analyses of climatological and socioeconomic trends and of the few high value risks will provide more and more powerful tools to promote the strongly needed elementary loss prevention.



**Fig. 1:** Development of annual (a) elementary losses, (c) fire losses and (d) investments for prevention between 1980 and 2005. b) Relationship of number of loss events to total amount of loss. Data (indexed to 2005) from the Intercantonal Reinsurance (IRV).

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