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Earthquake Risk & Reinsurance
Play as one to Win

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Technological progress accelerates innovation but also creates new risks

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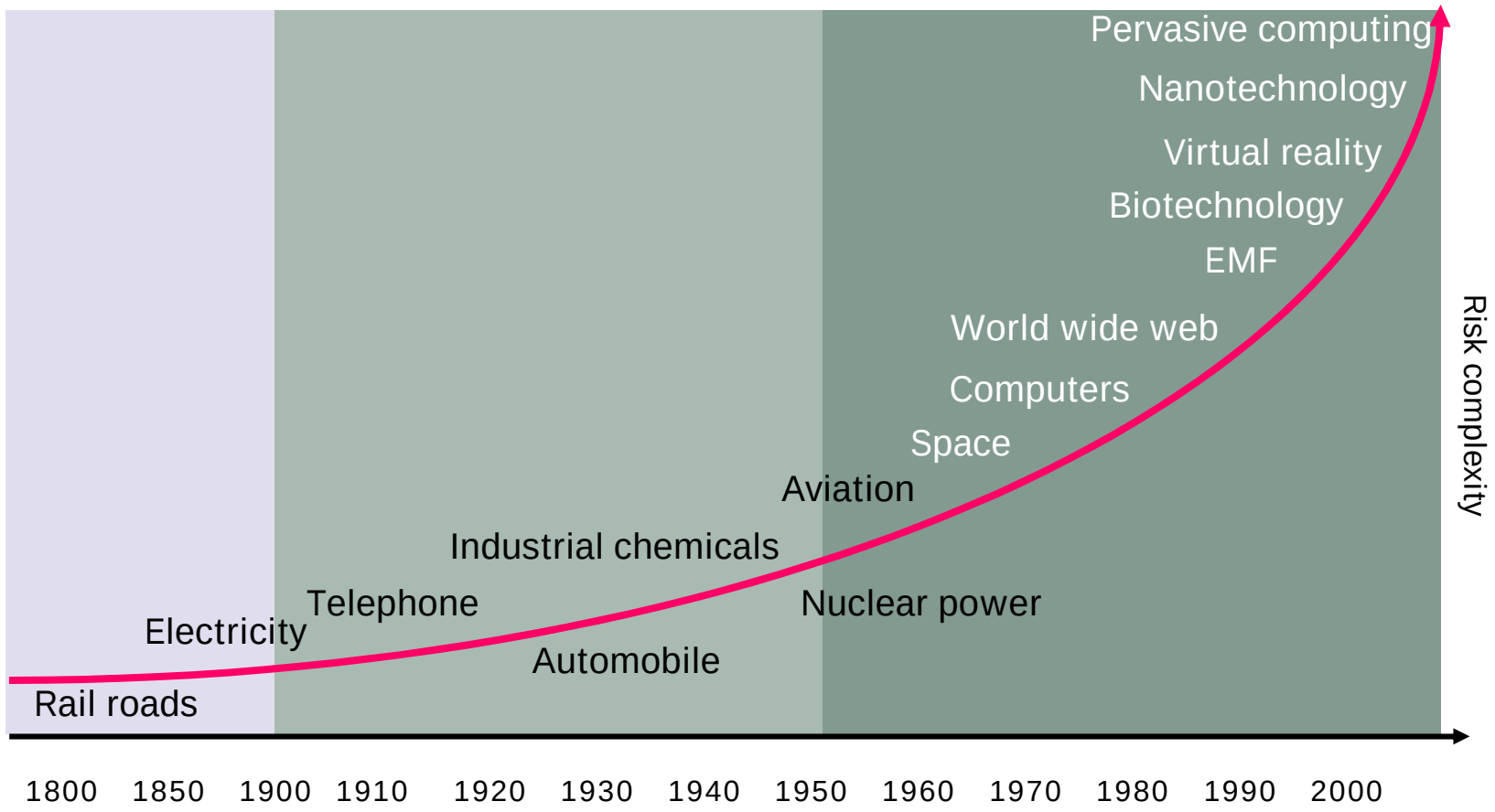

Risks have become increasingly more severe

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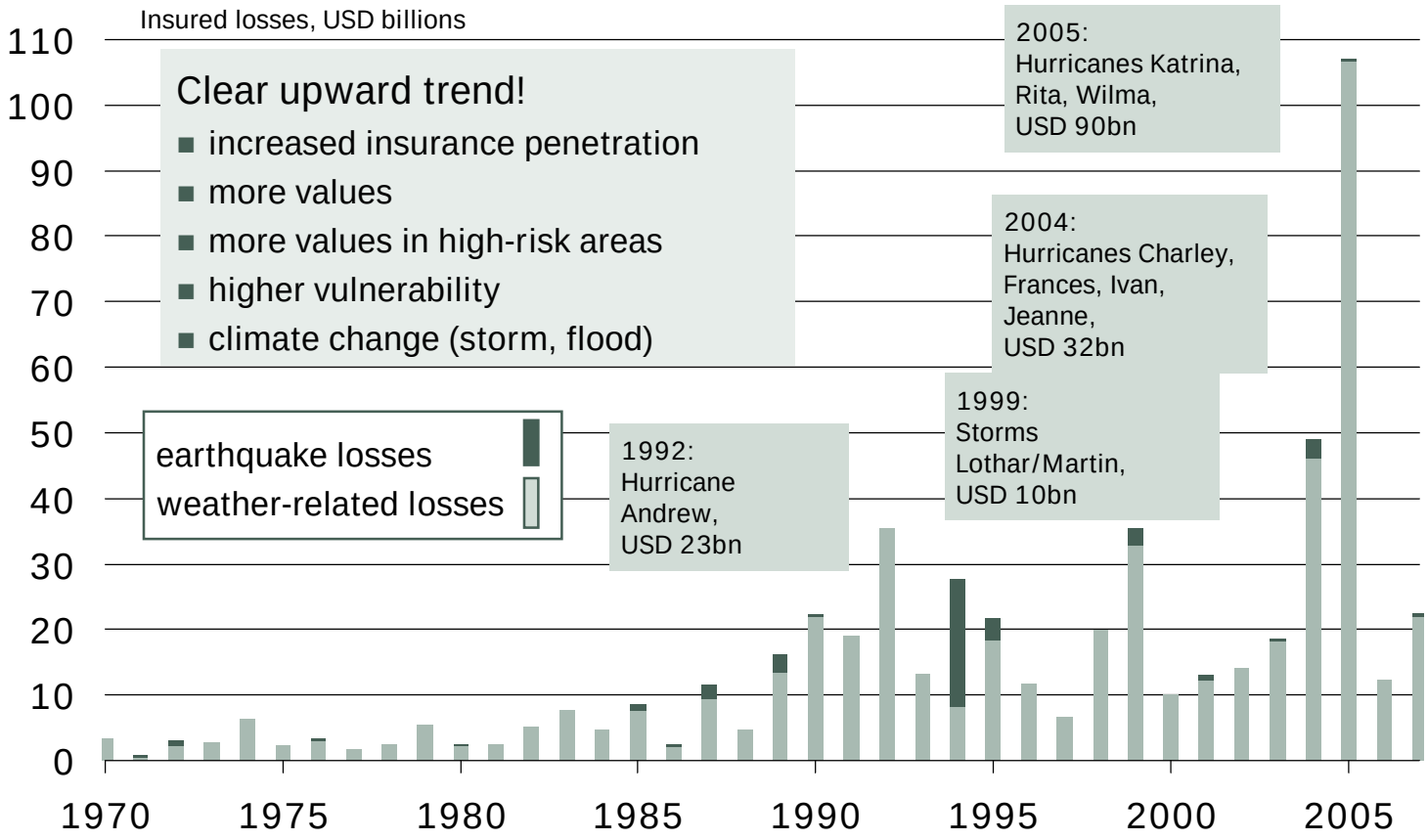
Ocean Drive, FL, 1926

Ocean Drive, FL, 2000



Insured worldwide cat losses > 40m (property/business interruption) at 2007 price levels in USDbn
Source: Swiss Re Economic Research & Consulting

Turkey's exposure to natural catastrophe risks

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- Turkey is highly exposed to a variety of natural catastrophe risks:
  - earthquakes
  - floods
  - landslides
  - rock sliding
  - storms
  - avalanches
- Earthquakes have the largest catastrophe potential among natural perils
- Nevertheless seismic risks are often underestimated among the population because
  - severe earthquakes have long return periods
  - people often repress bad experiences very fast
  - there is a tendency to believe it won't happen to me

Earthquakes in Turkey - Recapping the big events of the last 20 years

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Turkey is located in a very active seismic region, with an exceptionally long historical record of highly damaging earthquakes occurring in various parts of the country. More than 100 earthquakes above magnitude 5.0 happened in the 20th century.

1999 Earthquake (7.0) Izmit

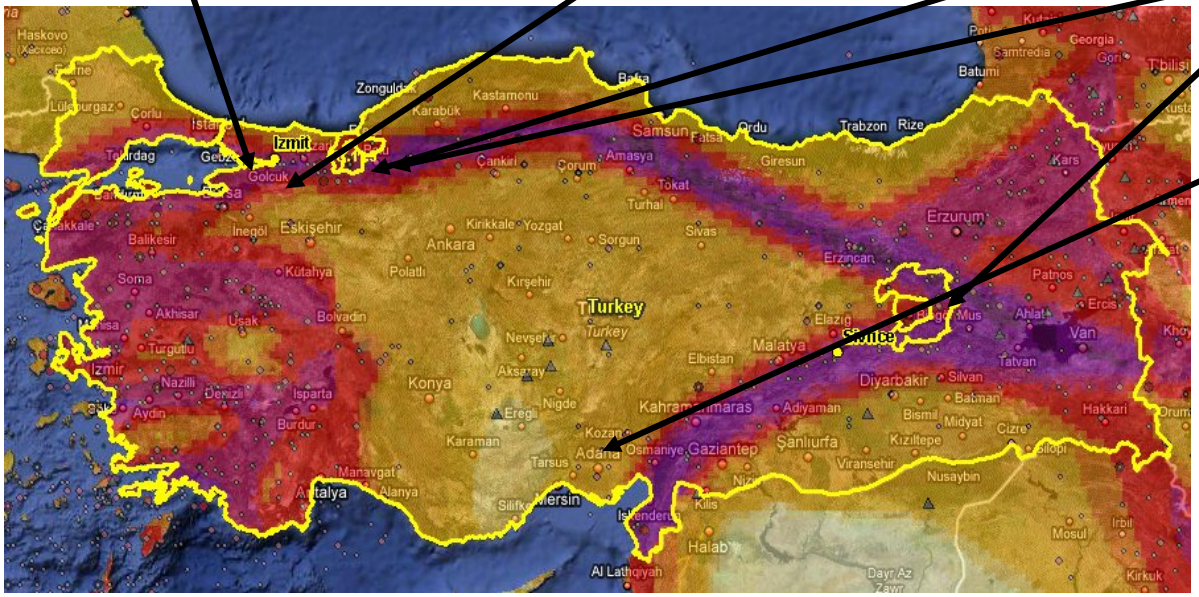
2003 Earthquake (5.6) Izmit

2005 Earthquake (5.6) Bingöl

2003 Earthquake (6.4) Bingöl

1999 Earthquake (6.8) Düzce

1998 Earthquake (7.9) Adana



Seismic Hazard - Earthquake

Very high (MMI X)	Significant (MMI VIII-)
Very high (MMI IX)	Moderate (MMI VII+)
Very high (MMI IX-)	Moderate (MMI VII-)
High (MMI VIII+)	Low (MMI VI)
High (MMI VIII)	Very low (MMI V)

Sources: Swiss Re geoPortal

- Apart from Ankara all densely populated areas in Turkey are exposed to at least significant earthquake risk. More than 70% of the population lives in at least high exposed areas.
- Istanbul, the economic centre of Turkey, is most vulnerable as it has more than 10 million inhabitants and contributes more than one third of national tax revenues.

Natural catastrophes: Future Looking ahead

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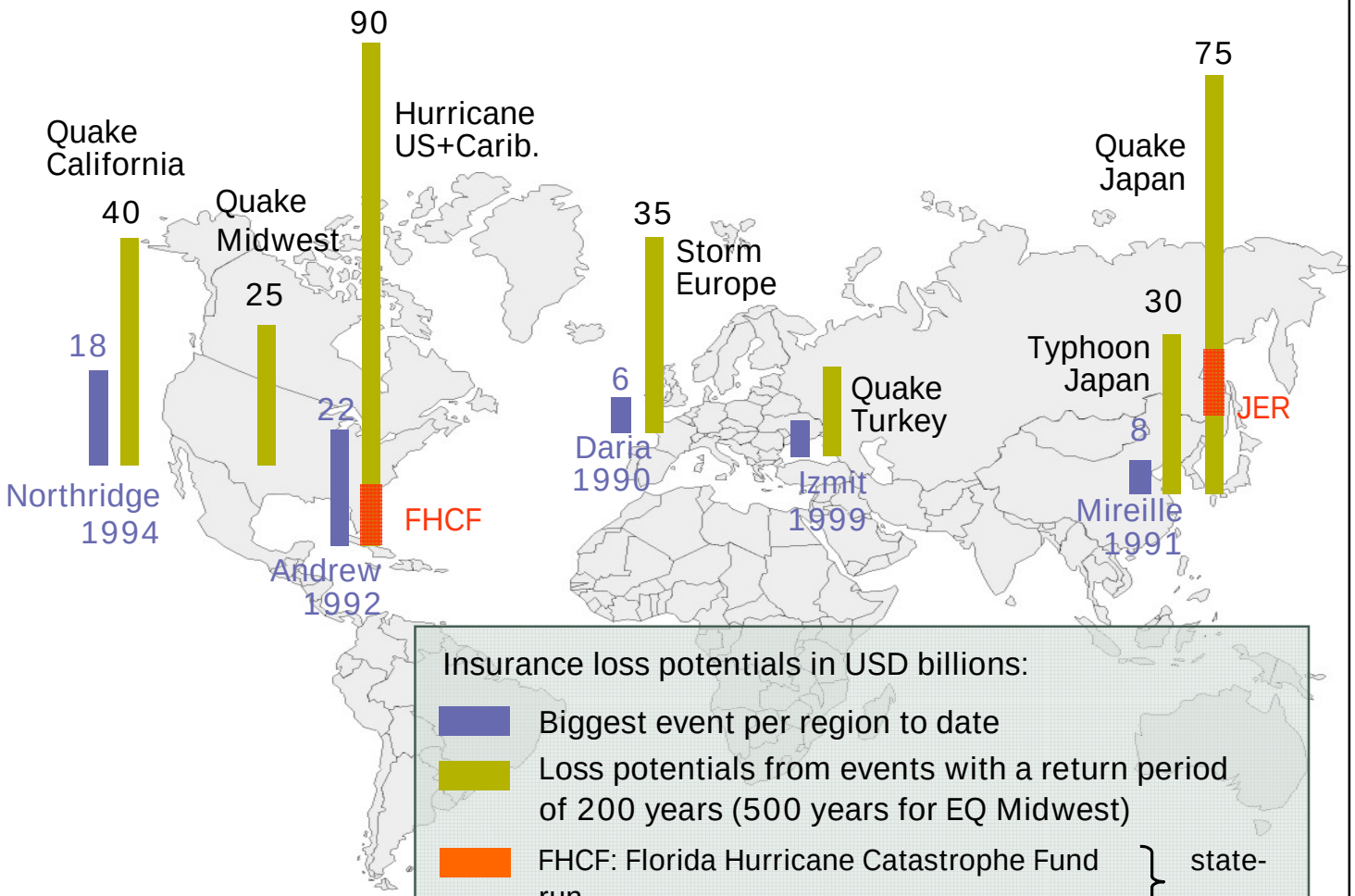

Gap between economic and insured losses is widening

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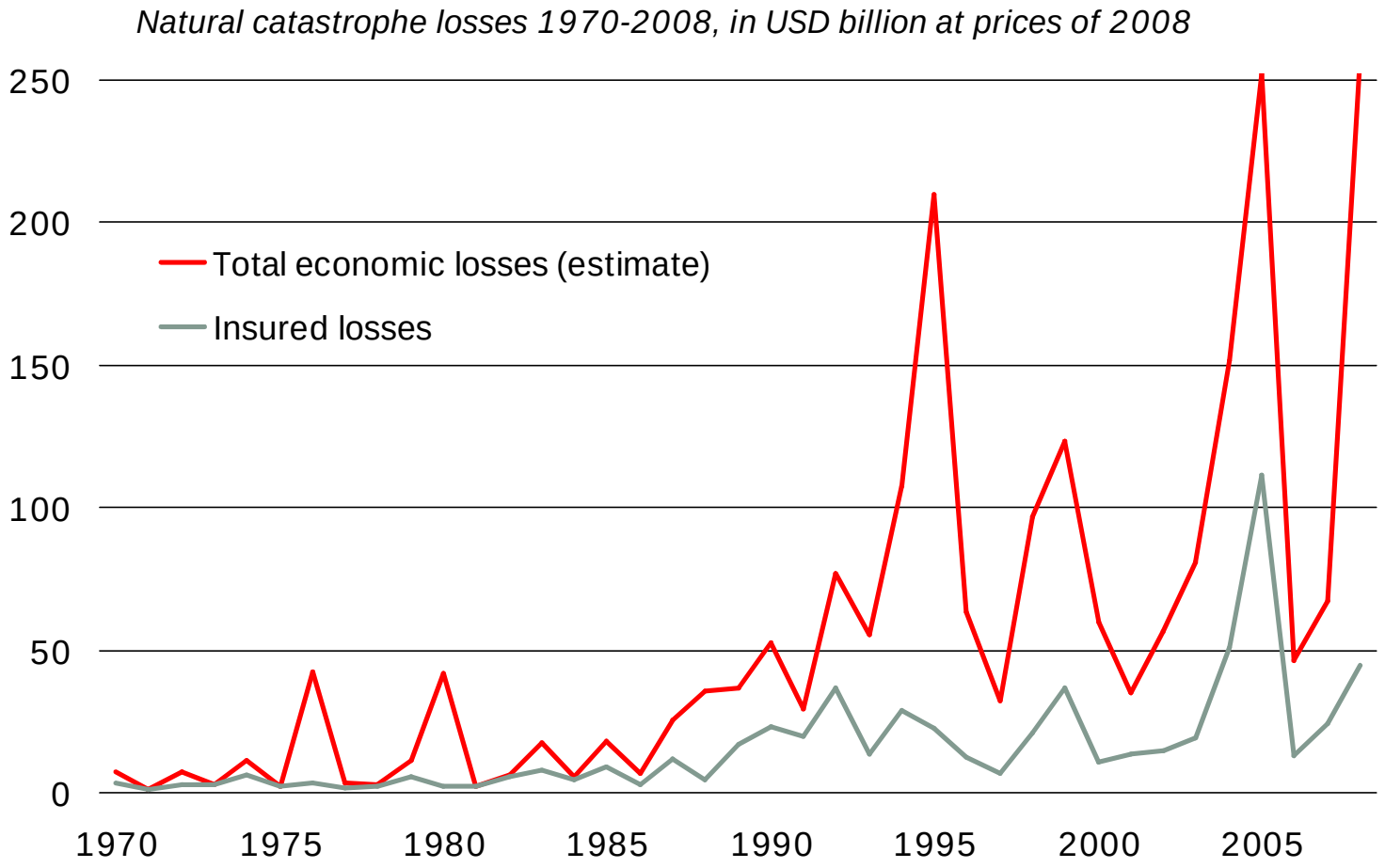
Only a fraction of total losses is covered by insurance



Source: Swiss Re Economic Research & Consulting

For many large loss potentials the un-insured portion is significant

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Country	Reference event	Return period in years, approx.	Economic loss in USDbn	Economic loss in % of GDP	of which, not insured
Japan	earthquake	200	500	11.5%	90-95%
US	California earthquake	200	300	2.3%	80-90%
US	hurricane	200	300	2.3%	40-60%
Japan	typhoon	200	50	1.1%	60-80%
Italy	earthquake	500	50	2.7%	70-80%
Turkey	earthquake	500	50	12.6%	70-80%
Mexico	earthquake	500	50	5.9%	80-90%
Portugal	earthquake	1000	50	25.9%	80-90%
UK	windstorm	200	30	1.3%	10-30%
Canada	earthquake in BC	500	20	1.6%	30-50%
Israel	earthquake	1000	20	14.4%	30-50%
Australia	earthquake in Sydney	1000	20	2.7%	30-50%
France	windstorm	200	15	0.7%	10-30%
Germany	windstorm	200	15	0.5%	40-60%

Source: Swiss Re *sigma* No. 2/2007

The financial impact of the 1999 earthquakes on the public budget…

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- The devastating earthquakes in 1999 resulted in significant financial losses exceeding by far USD 10 billion.
- Only a small portion of the total economic losses have been absorbed (mainly commercial and industrial risks) by the insurance industry.
- Hence from one day to the other the Turkish government had to cope with a tremendous financial burden on its budget.
- The already tight government finances were all of a sudden burdened by*
  - immediate emergency relief measures (> USD 0.5 bn)
  - allocating public funds to the reconstruction of private housings (> USD 1 bn)
  - rebuilding of public infrastructure (> USD 0.5 bn)
  - evolving contingencies, e.g. for environmental pollution (up to USD 1 bn)
  - disaster mitigation efforts, incl. creation of insurance system: (> USD 0.5 bn)
  - costs resulting from refinancing, resp. add. public borrowing (> USD 1 bn)
  - revenue losses (e.g. tax losses, non-tax revenue losses, lost social security contributions)

As a result the Turkish government needed to increase taxes, introduce other revenue generating measures (e.g. cut in budget shares of specific institutions), rely on external donations and significantly revert to foreign debt financing.

Sources: State Planning Organisation, World Bank, OECD

Play as one to Win

- Efficient Role Play for Disaster Risk Management

- **Individual**
  Prevention, loss participation via deductible
- **Direct Insurance**
  Accumulation control, claims handling, regional spread of risk
- **Reinsurance**
  Capacity, international risk spread, Nat Cat know-how
- **Capital Markets**
  Additional capacity for mega risks
- **Government**
  Legislation, insurance supervision, emergency planning

Earthquake risk assessment: Four elements that determine a cat loss

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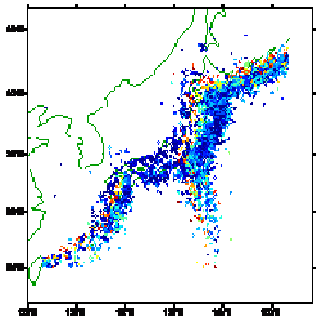
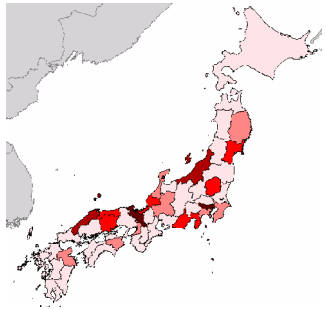
- Adequate earthquake risk assessment needs numerical risk models
- Risk models are only as good as available scientific knowledge
- Supporting scientific advance thus enables a better risk quantification to the benefit of all

1. Hazard	2. Value distribution	3. Vulnerability	4. Cover conditions
How often / how strong?	What exactly is covered	How well built and protected?	What is covered





- Sums insured
- Cover limits
- Deductibles
- Exclusions
- Multi-location
- etc.

Challenges & Conclusions

- Assure adequate EQ cover for both the public and private sector
- Define alternative EQ covers for the public sector
- Dynamics of the global insurance risk landscape require ongoing model improvements
- Partnerships between science and the insurance/ reinsurance industry are vital to cope with peak risks
- Play as one to win
- Swiss Re is highly committed to the Turkish Insurance market and here to provide expertise and significant r/i capacities
  (proportional, Non-Proportional or by the way of ILS, structured and/or other alternative deals etc.)

Q&A