Global Earth Observation - Benefit Estimation
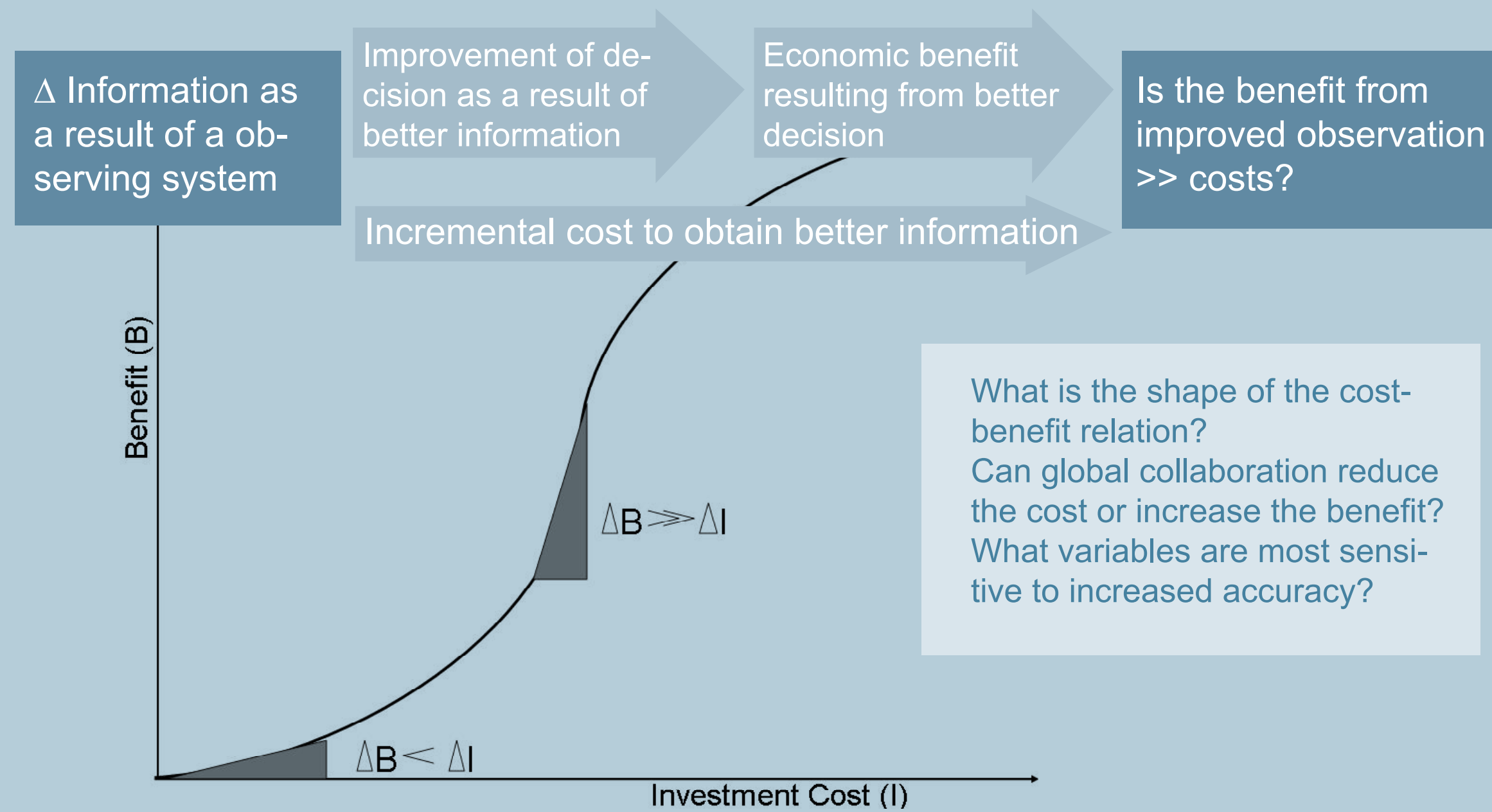## Now, Next and Emerging

GEOBENE

Assessing the economic, social and enviromental benefits of the GEO domains

Aims and Objectives

The EU funded project "Global Earth Observation – Benefit Estimation: Now, Next and Emerging" (GEO-BENE) aims at developing methodologies and analytical tools to assess Societal Benefits of Global Earth Observation (GEO) in the domains of: Disasters, Health, Energy, Climate, Water, Weather, Ecosystems, Agriculture and Biodiversity. The project will provide GEOSS-related policy conclusions from modelling exercises to support the implementation of international agreements.

Benefit chain

The Geo-Bene project has developed a 'benefit chain' concept as a framework for the benefit assessment. In the benefit chain concept benefits as well as costs must be considered. The concept looks at incremental changes of costs and benefits with respect to the already existing observing system (e.g. national).
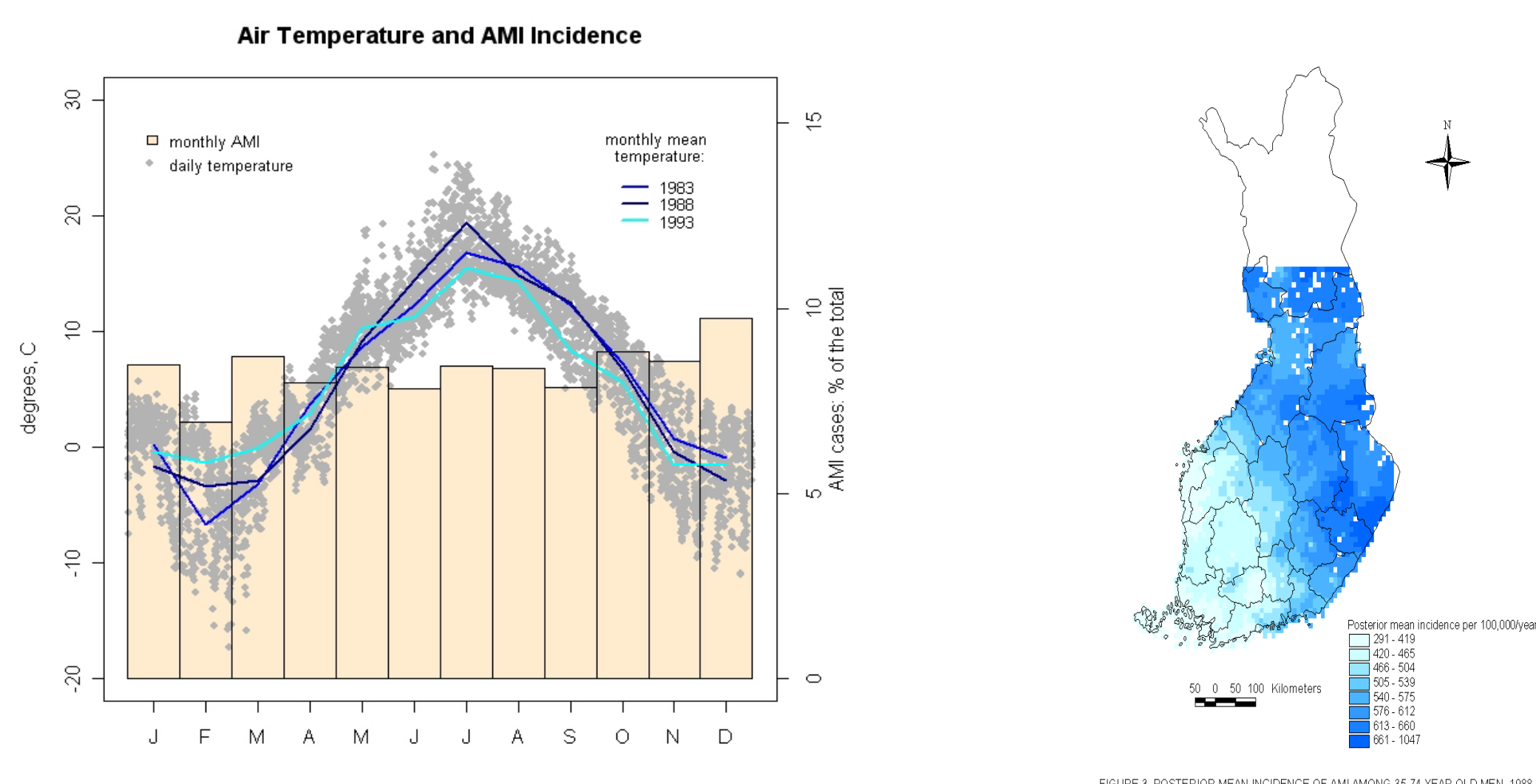
Δ Information as a result of a observing system → Improvement of decision as a result of better information → Economic benefit resulting from better decision → Is the benefit from improved observation >> costs?

Incremental cost to obtain better information

Benefit (B)

ΔB >> ΔI

ΔB < ΔI

Investment Cost (I)

What is the shape of the cost-benefit relation?
Can global collaboration reduce the cost or increase the benefit?
What variables are most sensitive to increased accuracy?

Benefit Chain Concept (Fritz et al., 2007)

Outlook

A model cluster comprising all 9 Societal Benefit Areas has been built and is successively applied. To date, no integrated assessments of the economic, social and environmental benefits of GEOSS have been carried out.
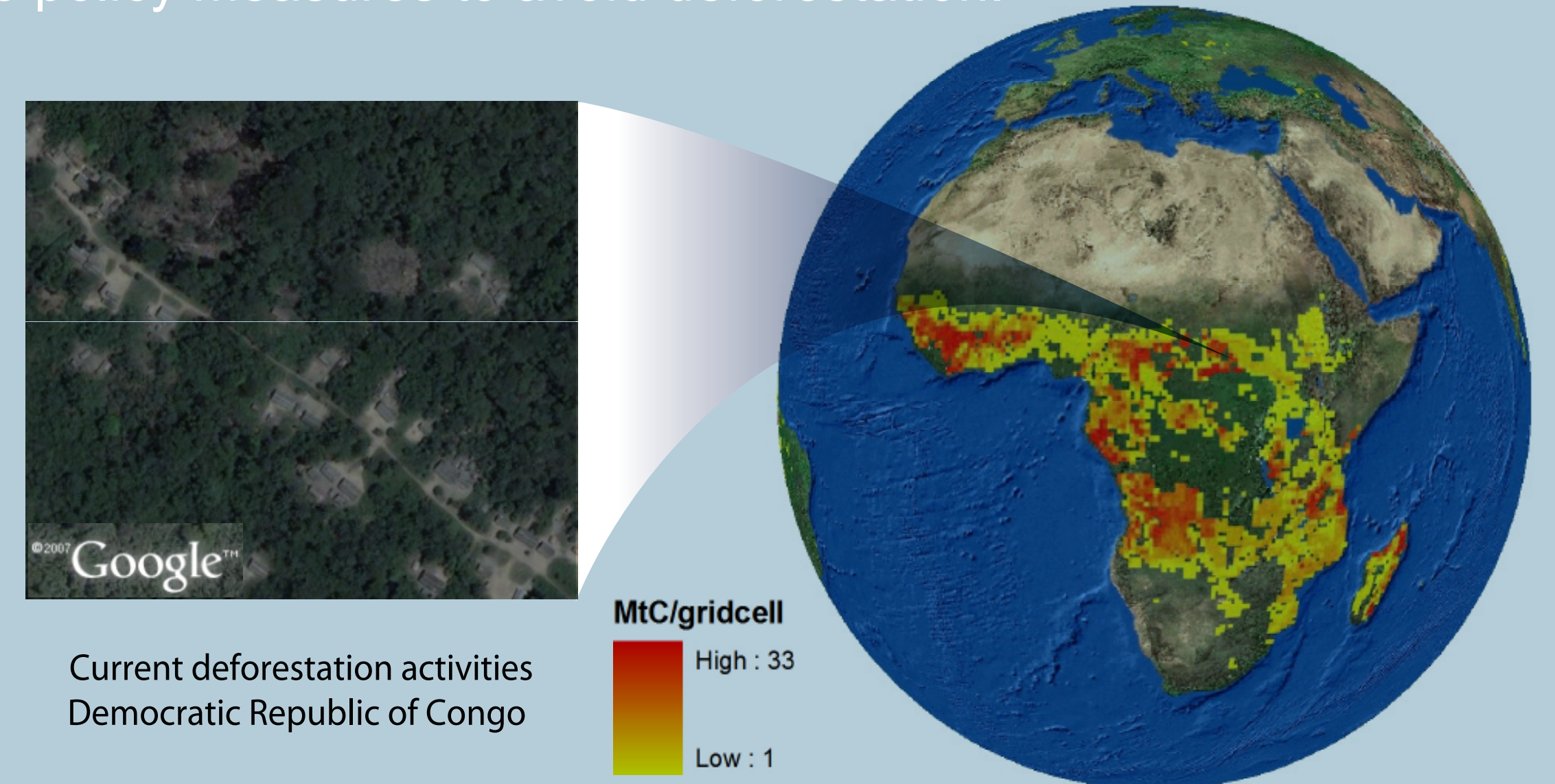
Results Health

By using improved weather forecasts combined with better knowledge on the relationship between Acute Myocardial Infarction and climate variables, lives can be saved considering that transit time to hospital is crucial.

Air Temperature and AMI Incidence

Weather and Acute Myocardial Infarction in Finland (Moltchanova et al., 2007)

Results Ecosystems

Current observation systems are able to detect deforestation activities, but not the actual biomass losses and the remaining stocks. Knowledge about the biomass stock of threatened tropical forests is vital to understand the impacts of deforestation and to design appropriate policy measures to avoid deforestation.

Current deforestation activities
Democratic Republic of Congo

MtC/gridcell
High : 33
Low : 1

MtC-grid cell saved when carbon price set at 12$-ton (Kindermann et al., 2007)

Results Disasters

As a result of international collaboration, better and hence higher resolution data can become available, informed by in-situ meteorological observations. It is possible to model the stochastic process of fire spread, and thus to estimate how much burnt area can be saved if the fire is detected quickly. A coarse versus fine grid (GEOSS) scenario is simulated.
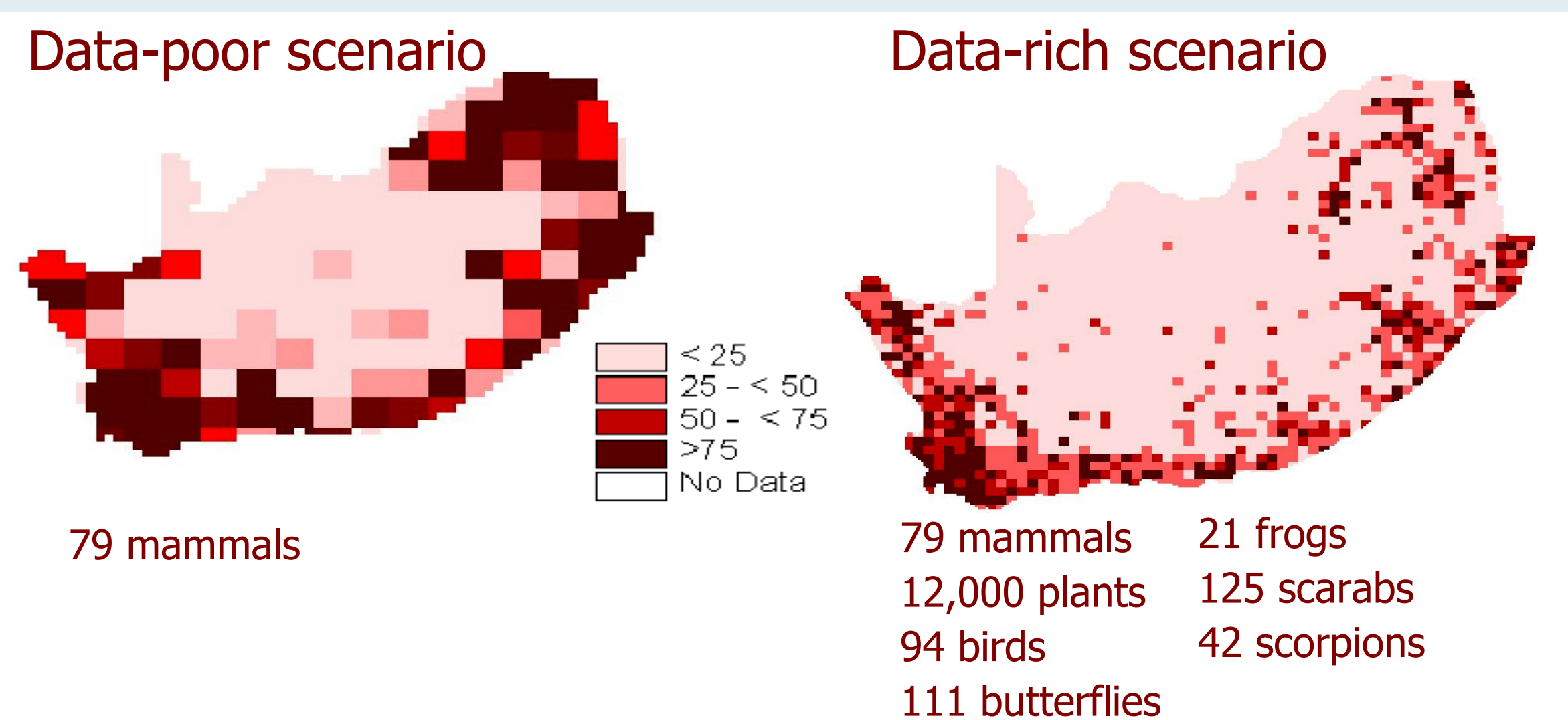
Summary of the forest fire simulations (average values)			
	Rough grid	Fine grid	Improvement
Burnt area, ha	107,417	85,248	20.64%
Number of patrols	45,404	43,772	3.62%
Total fire duration, h	64,650	49,405	23.58%

Forest Fire Modeling (Khabarov et al., 2007)

Results Biodiversity

By using higher resolution data opportunity costs for species protection can be reduced significantly.

Data-poor scenario

< 25
25 - < 50
50 - < 75
> 75
No Data

79 mammals

Data-rich scenario

79 mammals   21 frogs
12,000 plants   125 scarabs
94 birds   42 scorpions
111 butterflies

Species Protection (Jonas et al., 2005)

INFORMATION: www.geo-bene.eu

IIASA   felis   eawag aquatic research   PIK   CSIR   BOKU   KTL   vrije Universiteit amsterdam / IVM   UH   NIES

Design: Nadine Reuter