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HYPERTEXT

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Author	Company	Date	Signature
ROTHKEGEL, BAUMANN, BLANKE, BURGHARD	WIN-UMB-HLI-MULTH-CHEMNITZ		
Checked by			
ROTHKEGEL, GRECIANO	WIN-UMB-HLI-MULTH		
Approved by			
Christian ALEGRE & Cecile MONFORT	Thales Alenia Space		

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ABSTRACT

KEYWORDS

Copyright

TABLE OF CONTENTS

1 INTRODUCTION: AIMS OF THE MULTH-HYPERTEXT

1.1 PROBLEMS OF LANGUAGE USE: MEANING IS CONTEXT-DEPENDENT

Meaning and language use of lexical expressions do not form a unified and consistent system on the basis of a 1:1-relationship as there are differences of how an expression is understood in the several domains and single languages. This is an observation which is well known in the field of terminology and research on languages for special purposes. Even if the terms are defined according to some specified standards their use in communication is characterized through some variations of meaning.

1.2 SOLUTION

What we have to consider for coping with this kind of communication problem is that there are two aspects which are to be taken into account:

(a) [2] We have to distinguish between the conceptual level of terms that is independent on a single language and which is the basis for understanding and constructing meaning, on the one side, and, on the other side, the level of linguistic expressions of a single language that operate as designations ("Benennungen").

(b) We need a theoretically based model that allows the linking of the conceptual system of terms with information on the context in which the terms are relevant.

The Semantic Risk Representation Model (SERRMO) provides a bridge between the conceptual level and the data of language use. It is organized in terms of a hypertext tool that provides help for users who want to know some more specifications of the meaning of risk terms. Two situations of use are envisaged:

(i) the starting point refers to a concept (e.g. RISK ASSESSMENT), the user wants to know a) what conceptual context belongs to this term, and b) what are the lexical items that of these context categories;

(ii) the starting point refers to a lexical expression (e.g. *flood protection experts*) and the user wants to know some background of the corresponding concepts and the knowledge behind those kinds of expressions in order to use these expressions in documents or communications in an adequate manner.

2 SEMANTIC REPRESENTATION OF RISK MODELLING (SERRMO)

2.1 FRAMES AS THEORETICAL FOUNDATION

Our approach refers to the former "scenes-and-frames" semantics by Fillmore (starting at the end of the sixties) and the frame approach as it was adopted from psychology in both Artificial Intelligence research and text linguistics. Frames are defined on an ideational level as well as on a formal level. As content they represent some schemata of knowledge pieces which refer to generally known experiences and/or expectations on objects or events. Formally they are structured by attribute-value pairs (slot and fillers) that can be recursively combined and expanded. The knowledge-oriented view on frames was supplemented by Fillmore with scenes in order to bridge the frame attributes (categories) with language, especially with sentences describing objects, states on affair, procedures, actions and events. Fillmore introduced "the deep case schemata" as qualified predicate-argument structures of sentences.

In our model of SERRMO (SEmantic Risk Representation MOdel) we transform the Fillmore theory into an operational system. The level of definitions (see terminological approaches) is supplemented by a level which is represented in terms of frames. Three frames are distinguished: disaster frame (physical world), protection and risk frame (practical and theoretical world including action/reaction schemata with respect to three disaster phases: pre-event, in-event, post-event) and risk management frame (information management/software development). With respect to language use some specified fragments of frames are combined in terms of a semantic network that is linked to the corresponding lexical inventories of language use. The presentation of the linguistic information is organized according to a hypertext structure which allows the controlled selection of concepts (via networks) and/or lexical expressions (via index).

2.2 FRAMES FOR RISK MANAGEMENT – GLOBAL PERSPECTIVE

Risk communication and risk management are subject matters in several disciplines. Starting from the sociological line of research (e.g. Beck 1980, "The risk society") a variety of different approaches were established which also refer to different domains such as technology (including information technology), sports, areas of assurance, medicine, natural disasters. Nevertheless, a basic field of concepts has been created that includes terms such as risk, security, safety, protection, disaster, hazard, damage, vulnerability and many others. They are used in different communication situations and for different communication purposes. Thus risk communication plays a role in the public sphere of the mass media as well as in organizations which deal professionally with the topic of risk concerning tasks of management as well as tasks of concrete protection and help. And, last but not least, it concerns the different areas of research.

Concerning the "risky world" of our model we provide an hierarchically structured framework in which the different frames are subordinated to the overall category of RISK MANAGEMENT (see Figure 1).

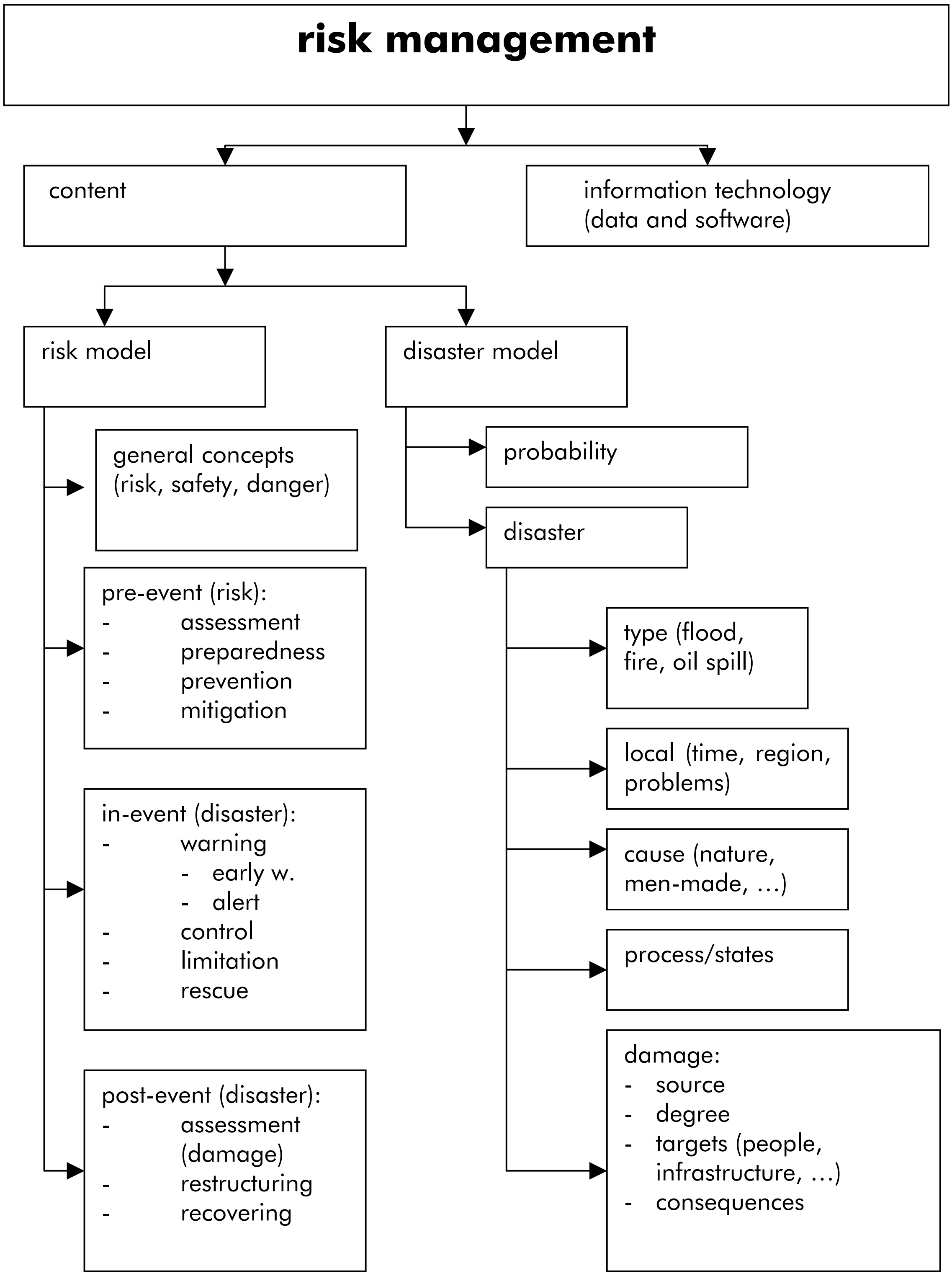


Figure 1. Disaster model and risk model within risk management

There are three super-frames which are relevant. They represent

(1) the "physical world" of facts, objects, and events in which potential disasters, real disasters and their consequences are involved (disaster model);

(2) the "theoretical world" of risk concepts and as a consequence of it the "practical world" of human interventions (operations as actions and reactions by humans and organisations; risk model); risk concepts: RISK, DANGER, HAZARD, SAFETY, etc; interventions: ASSESSMENT, PREVENTION, LIMITATION, etc.

(3) the "world of information management" in which the DISASTER model and the RISK model are dealt with in terms of data.

The categories of representation (as metalanguage) are transformed into frame structures in terms of attribute value pairs. Each attribute can be specified by a value (= lexical item) or it can be specified by new attributes. The hierarchical relationships are represented in terms of embedded square brackets.

The overall frame has the following form:

```
[RISK MANAGEMENT        =
        [CONTENT        =
                [EVENT (disaster model)        =    ... ]
                [INTERVENTION (risk model)     =    ... ]    ]
        [INFORMATION TECHNOLOGY                =    ...      ]    ]
```

(1) The physical world is represented by a disaster model which is provided by a basic model of the processes of events. Processes are considered to be changes of physical states which are "normal and desired" or in case of failures "not-desired". In this view a disaster is understood as an event that is a not-desired event within the normal run of events because of its damage and loss (or danger of damage and loss). In risk research there is a distinction of processes which can be controlled and those ones which cannot be controlled. Natural disasters as such as flooding because of storm or earthquake cannot be controlled whereas the intentional damming-up of water on a region for construing a dam is a controlled event (details in section 2.3).

The DISASTER frame (EVENT frame) is described as follows (super-level):

```
[EVENT DISASTER         =
        [SPECIFICATIONS         =    ...    ]
        [PHASES                 =    PRE-EVENT, IN-EVENT, POST-EVENT]
        [DAMAGE                 =    ...    ]    ]
```

(2) The practical world of reacting to a (potential or real) disaster is represented by a risk model. The conceptual handling of what a risk might be considered to be is reflected in a knowledge schema which is based and discussed in risk research. In this view it corresponds to the terminological basis

of MULTH and the applied classification systems (key terms). A second line is oriented towards the contexts in discourse and different discourse types. This concerns mainly the description of the interventions themselves on a deeper level of the hierarchical order and refers to the scenes semantics that considers the actions in terms of actors and activities (details in section 2.4).

The INTERVENTION frame (RISK frame) is described as follows (super-level):

[INTERVENTION RISK =
    [ACTORS = …]
    [ACTIVITIES/PHASES =
        [RISK DETECTING (pre-event) = …]
        [REACTING (in-event) = …]
        [REBUILDING (post-event) = …]]]

The frame representations of the different models provide the basis for building up some specified configurations of slots. There are two cases to be distinguished:

(a) frames or fragments of them are combined (horizontal configuration building) or

(b) a single category (class, slot) is structured in more detail up to the predicate-argument structures of action fields (vertical configuration building):
ACTION TYPE (ACTOR(S), OBJECT, … , PURPOSE), e.g.
ACTION TYPE = *providing* (ACTOR = *organization x*, OBJECT = *safety device*, PURPOSE = *preventing (disaster))*
or even more specified in distinct ACTIONs, e.g.
improving (organization x, embankment, for preventing disaster (TYPE *flood/river))* or
improving (organization x, dike, ….) or *diking/Eindeichung (organization x,* MEANS: *sandbags*)

According to "scenes-and-frames" semantics the configurations can be "typed". This means that there is a manageable set of configuration types that allow the identification of an expression within "its" configuration type. The following examples demonstrate the applied procedure in which configurations are constructed by combination of some general attributes of the models (see disaster model and risk model in Figure 1) with very specific attributes or even fillers in terms of single language expressions. The assumption is that there are core concepts (that are also expressed in terms of language expressions) as well as expressions which only operate as fillers (terminals). The following examples demonstrate some possible types (BE (states), HAVE (properties), HAPPEN (events), ACT (actions)), PROCESS (management) e.g.:

DISASTER/*disaster/Katastrophe* :

BE [[TYPE=], PLACE=], TIME=]]
HAVE [[CAUSE [TYPE=]], DAMAGE [TARGET=, SOURCE=, DEGREE=]]
HAPPEN [[STATES=, PROCESSES=]]

DISASTER AID/ *disaster aid/ Katastrophenhilfe* :

ACT [IN-EVENT [RESCUE [ACTOR=, DAMAGE [TARGET= VICTIMS =]]]
ACT [POST-EVENT [RESTRUCTURING [ACTOR, DAMAGE [TARGET= INFRASTRUCTURE =]]]]

DISASTER PREPAREDNESS / *disaster preparedness/ Katastrophenvorsorge*:

ACT/PREPARING [PRE-EVENT [ACTOR=, OPERATIONS= [ACTOR=, …]]]

RISK/ *risk/Risiko*:

BE [DANGER [DAMAGE [SOURCE=], DEGREE=], TARGET=], COSTS=]]]

<u>Examples for the description of lexical items: :</u>

fire risk /Feuerrisiko:

BE [DANGER [DISASTER [TYPE=fire], DAMAGE […]]]

acceptable risk / akzeptables Risiko:

ACT/TOLERATING [[ACTOR/VICTIM=], [DANGER [DAMAGE [SOURCE=], [DEGREE=], [TARGET=], [COSTS=]]]

flood risk management / Management für Hochwasserrisiko

PROCESS/ORGANIZING [ACTOR=, DATA/INFORMATION= [DANGER [DISASTER [TYPE=flood], [DAMAGE […]]]]]

Whereas domain knowledge refers to classification systems that are provided through experts in the field (e.g. risk research, risk/disaster documentation, standardization activities) linguistic knowledge refers to the semantics of language use. Whereas the classification systems reflect some paradigmatic relationships (e.g. hierarchical orders of discrete concepts on a highly abstract level) language use is organised in terms of syntagmatic relations as they occur in texts. In our model "context" is considered to combine both aspects. Correspondingly, the conceptual level is represented not only by the concepts of the classification systems but also by syntagmatic aspects in terms of configurations (and configuration types). Reversely, the level of single language expressions is not only represented by the fillers of the concepts (or values of the attributes) but also by paradigmatic aspects in terms of lexical inventories of alternative or semantically related expressions such as: *risk -> risk assessment -> risk assessment management* or *disaster -> disaster prevention -> disaster prevention operations.*

Lexical inventories are linked to some specified concepts (attributes) within a specified configuration, e.g.

disaster control (fragment):

MEASURING (type in-event operation):

ACTOR = experts, flood experienced experts / hochwassererprobte Fachgruppen, Experten,, Einsatzkräfte, erfahrene Fachleute
STATE (disaster) = water level / Pegelstand, Hochwasserscheitel
INSTRUMENT = water gauge / Wasserstandsanzeiger

The collection and organization of lexical inventories is based on empirical research. This means that the data acquisition refers to authentic texts from different discourse contexts.

(3) The world of handling data is structured according to the following super-frame:

[INFORMATION TECHNOLOGY =

[**SYSTEM** =
[[TYPE = …]
[ARCHITECTURE = …]
[MODULES = …]]

[**DATA MANAGEMENT** =
[[TYPE = …]
[PROCESSING =
[[INPUT/OUTPUT = …]
[WORK = …]
[SECURITY PROTECTION = …]]
[TRANSFER = …]]

[**TOOLS** = …]]

2.3 THE DISASTER FRAME

The DISASTER frame reconstructs the knowledge on an event that has not wanted effects because its impact refers to damage of the existing situation in a region. A disaster might be caused naturally (natural disaster) or technologically (industrial disaster) or sociologically. In this view the description of a disaster in terms of frames is dependent on the theories that are used as basis. The disaster frame in this work is related to the domains which are represented in the glossary. According to the super frame (see above) there are three main categories that are specified: SPECIFICATIONS, PHASES and DAMAGE.

```
[SPECIFICATIONS (DISASTER)    =
      [DOMAIN          =     nature, technology, society,        ...     ]
      [TYPE            =     flood, forest fire, oil spill,      ...     ]
      [ORIGIN          =     natural (geological, hydrological, ...)
                             man-made (transport, nuclear, ...  )]
      [AREA/REGION     =
            [LOCATION              =     ...     ]
            [SPATIAL EXTENT        =     ...     ]
            [LOCAL CONDITIONS      =     ...     ]       ]
      [TIME            =
            [PERIOD OF TIME        =     ...     ]
            [TIME OF OCCURRENCE    =     ...     ]
            [DURATION              =     ...     ]       ]
      [INTENSITY/DEGREE      =     ...     ]
      [SOURCE                =     ...     ]
      [CAUSE                 =
            [PERCIPITATION         =     snow, rain, hail, ...       ]
            [DRYNESS               =     ...                         ]
            [...                                                     ]
      [RELEASE         =     ...               ]
      [STATES          =     ...               ]
      [PROCESSES       =     ...
            [TYPE                  =     ...               ]
            [COURSE                =
                  [RUN OF EVENTS         =     ...     ]
                  [STRUCTURE             =     single, sequential, combined ] ]] ]
```

[**PHASES (DISASTER)** =
[PRE-EVENT =
[PROBABILITY = …]
[(IN-) CERTAINTY = …]
[OBJECT (SAFETY) = …]
[KNOWLEDGE = …]
[FREQUENCY = …]]
[IN-EVENT =
[CASES = …]]
[POST-EVENT =
[CONSEQUENCES =…]]]

[**DAMAGE (DAMAGE EVENT/DISASTER)** =
[TARGET =
[HUMAN =
[HUMAN GROUPS = …]
[LOSS =
[TYPE OF LOSS = life, injuries]
[QUANTITY = …]]]
[PROPERTY/OBJECTS =
[TYPE = …]
[LOSS = …]]
[INFRASRTUCTURE =
[TYPE = …]
[LOSS = …]]
[ECONOMIC ACTIVITIES =
[TYPE = …]
[LOSS = …]]
[ENVIRONMENT/NATURE =
[TYPE = …]
[LOSS = …]]
[VULNERABILITY =
[PEOPLE = …]
[PROPERTY/OBJECTS =]
[INFRASTRUCTURE =]
[ECONOMIC ACTIVITIES =]
[ENVIRONMENT =]]
[SUSCEPTIBILITY =
[PEOPLE = …]
[PROPERTY/OBJECTS =]
[INFRASTRUCTURE =]
[ECONOMIC ACTIVITIES =]
[ENVIRONMENT =]]
[DEGREE =]]

2.4 THE RISK FRAME

The risk frame reconstructs some standards of both the theoretical classification of terms and the planned reactions to disaster events: how to identify them, how to assess them, how to prevent them. This is described in the INTERVENTION frame that is structured in two parts: ACTORS and ACTIVITIES.

The following frame represents the design of the ACTIVITIES:

[**INTERVENTION** =
[ACTORS = …]
[ACTIVITIES =
[RISK DETECTING (pre-event) = …]
[DISASTER REACTING (in-event) = …]
[REBUILDING (post-event) = …]]]

[**RISK DETECTING (pre-event)** =
[RISK ASSESSMENT =
[RISK PERCEPTION =]
[PERCEPTION = …]
[EXPERIENCE = …]
[OBSERVATION =
[METHOD = satellite]
[PROGNOSES =]]
[RISK ANALYSIS =
[FEATURES = …]
[SITUATION/CONTEXT = …]
[SIMULATION = …]
[PROBABILISTIC = …]
[RELIABILITY = …]]
[RISK IDENTIFICATION =
[SOURCE = …]
[DAMAGE CAUSE = …]
[DAMAGE TARGET = …]
[CAPACITY = …]]
[RISK EVALUATION =
[VALUE = neglectable, (not) acceptable]
[MAGNITUDE = nil, low, moderate, high, extreme]
[POSSIBILITY OF REPAIR = reparable, partly r., not r.]
[RISK PREPAREDNESS =]
[RISK PREVENTION =]
[RISK MITIGATION =]
[RISK COMMUNICATION =]]

[**DISASTER REACTING** (in-event) =

[WARNING =
[EARLY WARNING = …]
[ALERT = …]]
[CONTROL = …]
[LIMITATION = …]
[RESCUE = …]]

[**REBUILDING** (post-event) =

[DAMAGE ASSESSMENT = …]
[RESTRUCTURING = …]
[RECOVERING = …]

2.5 REPRESENTATION OF THE GLOSSARY ENTRIES

The frames are the information source for the semantic description of the lexical expressions (terms). The semantic representation of each entry from the glossary consists of the extracted frame fragments. These fragments are selected from the terminological part of the thesaurus and from examples of the discourse corpus (see Deliverable 2201).

Seminfo entries

acceptable risk
TOLERATE [[ACTOR/VICTIM=], [DANGER [DAMAGE [SOURCE=], [DEGREE=], [TARGET=], [COSTS=]]

accident
HAPPEN [EVENT [SPECIFICATION [ORIGIN=man-made], [TYPE=], [AREA=], [TIME=]], [DAMAGE [TARGET [HUMAN=, PROPERTY=, INFRASTRUCTURE=, ECONOMIC ACTIVITIES=, ENVIRONMENT=]]]]

afflux
BE [[TYPE=flood], [PLACE=], [TIME=]], HAVE [CAUSE [[ORIGIN=], [NIEDERSCHLAG [TYPE=]], [STAU [TYPE= *Aufstau*]]], DAMAGE [TARGET=, SOURCE=, DEGREE=]], HAPPEN [STATES=, PROCESSES=]]

albedo
BE [EVENT [SPEZIFICATION [CAUSE=climate change [RELATIONSHIP=radiation]]]]

API-gravity
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

backwater
BE [[TYPE=flood], [PLACE=], [TIME=]], HAVE [CAUSE [[ORIGIN=], [NIEDERSCHLAG [TYPE=]], [STAU [TYPE= *Rückstau*]]], DAMAGE [TARGET=, SOURCE=, DEGREE=]], HAPPEN [STATES=, PROCESSES=]]

barrel
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

biodiversity
ACT [INTERVENTION [ACTIVITIES [RISK PREVENTION [PROTECTING] [EVENT [DAMAGE [TARGET=nature/biodiversity]]]]]]

biological hazard
BE [[INTERVENTION [PRE-EVENT [ASSESSMENT =]]], [PROBABILITY [DISASTER [ORIGIN [NATURAL = biological]]]]]

black tide
BE [DISASTER [TYPE=oil spill [SUBTYPE=]], [ORIGIN=man-made]]

chemical hazard
BE [[INTERVENTION [PRE-EVENT [ASSESSMENT =]]], [PROBABILITY [DISASTER [ORIGIN [MANMADE = chemical activities]]]]]

civil protection
ACT [PRE-EVENT [PROTECTION [ACTOR= operators, TARGET=civilization, environment [DISASTER [DAMAGE]]]]]

climate change
BE [DISASTER [CAUSE=climate]]

controlled weir
BE [LIMITATION [PROTECTION OBJECT= *controlled weir*]]

coping capacity
BE [[INTERVENTION [PRE-EVENT [ASSESSMENT =]]], [DISASTER [DAMAGE [SUSCEPTABILITY =]]]

cosmic radiation
BE [EVENT [SPECIFICATION [CAUSE=climate change [RELATIONSHIP=radiation]]]]

counter measures
REDUCE [PRE-EVENT [ACTOR= authorities, operators] PROBABILITY [DANGER [DAMAGE= [TARGET=infrastructure, environment]]]]

crude oil
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

dam
BE [PREPAREDNESS [PROTECTION OBJECT= *dam*]]

damage
BE [ASSESSMENT [DAMAGE [RISK SOURCE = , DAMAGE-EVENT = , TARGET = , DEGREE = , VALUE =]]]

damage assessment
ACT [ACTOR= [IDENTIFY [DAMAGE [RISK SOURCE =, DAMAGE-EVENT =, TARGET =], [EVALUATE [VALUE =, DEGREE =]]]

damage potential
BE [DISASTER [DAMAGE [TARGET =]]]

damage prevention
AVOID [PRE-EVENT [ASSESSMENT [DAMAGE [RISK SOURCE=, DEGREE=, TARGET=, CONSEQUENCES=]]]]

data
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TYPE=]]]]

data capture
RISK MANAGEMENT [IT [SYSTEM [CONTENT

[PROCESSING [INPUT/OUTPUT=]]]]]

data entry
RISK MANAGEMENT [IT [SYSTEM [CONTENT [PROCESSING [INPUT/OUTPUT=]]]]]

data flow
RISK MANAGEMENT [IT [SYSTEM [CONTENT [PROCESSING [WORK=]]]]]

data link
RISK MANAGEMENT [IT [SYSTEM [CONTENT [ORGANISATION/STRUCTURE=]]]]

data processing
RISK MANAGEMENT [IT [SYSTEM [CONTENT [PROCESSING]]]]

data provider
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TRANSFER=]]]]

data protection
RISK MANAGEMENT [IT [SYSTEM [CONTENT [PROCESSING [PROTECTION]]]]]

data security
RISK MANAGEMENT [IT [SYSTEM [CONTENT [PROCESSING [PROTECTION=]]]]]

data service
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TRANSFER=]]]]

data storage
RISK MANAGEMENT [IT [SYSTEM [CONTENT [ORGANISATION/STRUCTURE=]]]]

data user
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TRANSFER=]]]]

database
RISK MANAGEMENT [IT [SYSTEM [CONTENT [ORGANISATION/STRUCTURE=]]]]

disaster
BE [[TYPE=], PLACE=], TIME=]] HAVE [CAUSE [TYPE=]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]]
HAPPEN [STATES=, PROCESSES=]

disaster aid
ACT [IN-EVENT [RESCUE [ACTOR=, DAMAGE [TARGET= victims]]]
ACT [POST-EVENT [RESTRUCTURING [ACTOR, DAMAGE [TARGET=infrastructure]]]]

disaster map
REPRESENT [[DISASTER [DAMAGE [TARGET =]], EVENT [REGION =]]]]

disaster preparedness
PREPARE [PRE-EVENT [ACTOR=, OPERATIONS= [ACTOR=, ...]]]

disaster risk reduction
DIMINISH [PRE-EVENT [ACTOR=], PROBABILITY=]VULNERABILITY=], DANGER [DAMAGE=]]]

drainage flood
BE [[TYPE=flood], [PLACE=], [TIME=]],
HAVE [CAUSE [[ORIGIN=], [PERCIPITATION [TYPE=]],
[„Stau“ [TYPE=*backwater* [PLACE=*drainage*]]]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]],
HAPPEN [STATES=, PROCESSES=]]

earth observation
ACT [ACTOR = science, [INTERVENTION [ASSESSMENT [PERCEPTION [OBSERVATION [OBJECT = earth]]]]]]

earth observation satellite
BE [INTERVENTION [ASSESSMENT [PROVIDE [INSTRUMENT = satellite]]]]

emergency
BE [[EVENT [DAMAGE [TARGET =, DEGREE =]], [RESCUE [ACTOR]]]

emergency aid
MITIGATE [ACTOR =, DAMAGE [TARGET =, DEGREE =]]

emergency management
ORGANISE [ACTOR = authorities, INTERVENTION [EVENT [DAMAGE [TARGET =, DEGREE =]]]]

emergency measure
ACT [ACTOR = authorities [[RESCUE [DAMAGE [TARGET =]]], PREVENT [DAMAGE [TARGET =]]]]

emergency plan
REPRESENT [INTERVENTION [ACTOR = authorities]]

emergency planning
ACT [ACTOR = authorities, [INTERVENTION [REPRESENT [RESCUE [DAMAGE [TARGET =], [TIME [TIME OF OCCURRENCE =]]]]]]]

emergency response
ACT [ACTOR = authorities, [INTERVENTION [RESCUE [DAMAGE [TARGET =], [TIME [TIME OF OCCURRENCE =]]]]]]]

environmental degradation
BE [DISASTER [DAMAGE [CONSEQUENCE [ENVIRONMENT [STATE = degraded]]]]]

environmental hazard
BE [PROBABILITY [DISASTER [DAMAGE [TARGET=environment]]]]

environmental impact assessment
ACT [ACTOR = science, authorities, [INTERVENTION [ASSESSMENT [DISASTER [DAMAGE [TARGET [ENVIRONMENT =]], [IMPACT [ENVIRONMENT]]]]]]

equipment
BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTOR(S)], [ACTIVITIES/PHASES [REACTING [OPERATIONS [INSTRUMENTS=]]]]]]]

erosion
BE [DISASTER [TYPE = floods], [DAMAGE [IMPACT [ENVIRONMENT [STATE = erosion]]]]]

evaporation
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

event
HAPPEN [EVENT [SPECIFICATION [AREA [LOCATION=, SPATIAL EXTENT=, LOCAL CONDITIONS=]], [TIME [PERIOD=, TIME OF OCCURRENCE=, DURATION=]]]]

event tree analysis
ACT [ACTOR = science [RISK ASSESSMENT [ANALYSIS [EVENT [PROCESSES]]]]]

extent of flooding

BE [DISASTER [TYPE = floods], [AREA [EXTENT =]]]

file

RISK MANAGEMENT [IT [SYSTEM [CONTENT [ORGANISATION/STRUCTURE=]]]]

fire

BE [DISASTER [TYPE = fire], [DAMAGE =], [PROCESS= outspreading]]

fire alert

ACT [ACTOR = authorities , [INTERVENTION [REACTION = alert], [DISASTER [TYPE = fire]]]

fire brigade

BE [ACTOR = operators, [INTERVENTION [REACTION [DISASTER [TYPE = fire]]]]]

fire damage

BE [EVENT [SPECIFICATION [TYPE=fire]], [DAMAGE [TARGET=]]]

fire danger

BE [PROBABILITY [DISASTER [TYPE=fire]]]

fire equipment

BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTIVITIES/PHASES [REACTING [OPERATIONS [INSTRUMENTS=]]]]]]]

fire extinguisher

BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTIVITIES/PHASES [REACTING [OPERATIONS [INSTRUMENTS=]]]]]]]

fire fighting

ACT [ACTOR = authorities/operators, [INTERVENTION [LIMITATION [DISASTER [TYPE = fire], [DAMAGE [TARGET = life, property]]]]]

fire hazard

BE [PROBABILITY [DISASTER [TYPE=fire]]]

fire prevention

ACT [ACTOR = authorities , [INTERVENTION [PREVENTING [PROBABILITY [DISASTER [TYPE = fire]]]]]]

fire protection

PREVENT [PRE-EVENT [PROTECTION [DISASTER [TYPE= fire][DAMAGE]]]]
ACT [IN-EVENT [LIMITATION [DISASTER [TYPE= fire][DAMAGE]]]]

fire risk

BE [INTERVENTION [ASSESSMENT [PROBABILITY [DISASTER [TYPE = fire], [PROPERTY =], [IMPACT =], [RISK SOURCE = e.g. ignition sources]]]]]

fire spread model

BE [DISASTER [SPECIFICATIONS [TYPE=fire], [AREA/REGION [LOCAL CONDITIONS=]]]]

fire storm

BE [DISASTER [TYPE = mass fire], [AREA = urban], [IMPACT = generating winds from all sides], [INTENSITY = increasing]]

flame

BE [DISASTER [SPECIFICATIONS [TYPE=fire [SUBTYPE=]]]]

flash flood

BE [[TYPE=flood [ERSCHEINUNGSFORMEN [ZEIT=, QUANTITY=, MOVEMENT=, UNDERGROUND=TYPE [BANK, SHORE], HORIZONTAL=, VERTICAL= *flash flood*]]], [PLACE=]], [TIME=]],
HAVE [CAUSE [TYPE=]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]],
HAPPEN [STATES=, PROCESSES=]]

flash point

BE [DISASTER [SPECIFICATIONS [TYPE=fire], [AREA/REGION [LOCATION=]]]]

floating barrier

BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTIVITIES/PHASES [REACTING [OPERATIONS [INSTRUMENTS=]]]]]]]

flood

BE [DISASTER [TYPE = floods], [ORIGIN = natural], [PROCESSES [COURSE [RUN OF EVENTS = rise of water, temporary covering of land]]], [RELEASE = inundation, erosion, sediment deposition], [TIME [DURATION = long period], [AREA = stream, lake, coastal region], [CAUSE = e.g. extreme rainfall], [RELEASE = e.g. bursting of dike], [DAMAGE [TARGET =], [MAGNITUDE =]]

flood alert

ACT [ACTOR = authorities [REACTION [DECLARE [DISASTER [TYPE = flood]]]]]

flood control

ACT [ACTOR = authorities, [INTERVENTION [PROVIDE [RELIEF-OBJECT = e.g. dams, reservoirs, embankment]], [DISASTER [TYPE = floods], [DAMAGE [TARGET = people, property]]]

flood control levee

BE [INTERVENTION [DISASTER [TYPE = floods], [DAMAGE [RELIEF-OBJECT = dike, embankment]]]]

flood damage

ACT [ACTOR = authorities, [INTERVENTION [POST-EVENT [ASSESSMENT [DISASTER [TYPE = floods], [PROPERTY = rise of water, temporary covering of land], [IMPACT = inundation, erosion, sediment deposition], [TIME [DURATION =], [DAMAGE [TARGET =], [VALUE =], [MAGNITUDE =], [REPAIR =]], [COSTS =]]]]]]

flood forecasting

ACT [ACTOR = authorities, [REACT/ESTIMATE [DISASTER [TYPE = floods], [PROCESS/STAGE =], [TIME [TIME/OCCURRENCE =], [DURATION =]], [AREA =], [PROPERTY [DISCHARGE VALUE =]]]]]

flood forecasting system

REPRESENT [ACTOR = science, [PREDICT [DISASTER [TYPE = floods]]], [SYSTEM [MODEL]]]

flood hazard map

BE [OBJECT [PREEVENT [IDENTIFICATION [DISASTER [TYPE=flood], [AREA]], DAMAGE [TARGET, DEGREE]]]]

flooding incident

BE [DISASTER [TYPE = floods], [PROCESS =], [CAUSE =], [TIME =], [AREA =]]

flood plain

BE [[TYPE=flood], [PLACE=*flood plain*],
[TIME=]],
HAVE [CAUSE [[TYPE=]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]],
HAPPEN [STATES=, PROCESSES=]]

flood proofing
ACT [ACTOR= authorities, [PREVENT [DISASTER [TYPE = floods], [AREA =], [DAMAGE [TARGET = buildings]]]]]

flood risk
BE [PROBABILITY= , DAMAGE = [DISASTER [TYPE = flood]]]

flood risk area
BE [PROBABILITY [DISASTER [TYPE = floods], [AREA =]]]

flood risk management
ORGANISE [ACTOR=, DATA= [DANGER [DISASTER [TYPE=flood], [DAMAGE [...]]]]]

flood routing
ACT [ACTOR = science, [INTERVENTION [DETERMINE [DISASTER [TYPE = floods], [PROCESSES = movement of flood wave]]]]]

flood victims
BE [DISASTER [TYPE = flood], [TARGET = human, people]]

floodwater storage ponds
BE [INTERVENTION [DISASTER [TYPE = floods], [DAMAGE [RELIEF-OBJECT = storage ponds]]]]

flood wave
BE [DISASTER [TYPE = flood [SUBTYPE = wave]]]

flood way
BE [[INTERVENTION [PROVIDE [RELIEF-OBJECT = discharging channel]]], [DISASTER [TYPE = floods]]]

forest fire
BE [EVENT [SPECIFICATION [TYPE=fire]], [DAMAGE [TARGET [ENVIRONMENT [TYPE=forest]]]]]

forest-fire plan
REPRESENT [INTERVENTION [REACTION =], [DISASTER [TYPE = fire], [AREA/REGION [LOCATION= forest]]]]

forest fire-prone area
BE [PROBABILITY [DISASTER [TYPE = fire], [DAMAGE [AREA [LOCATION= forest]], [TARGET =], [VULNERABILITY =]]]]

gauging station
BE [PREPAREDNESS [CONTROL [ACTIVITY [PLACE=*gauging station*]]]]

geographic information
BE [ACTOR = science, [INTERVENTION [ASSESSMENT [PERCEPTION [OBSERVATION [INFORMATION = geographic]]]]]]

geographic information system
BE [ACTOR = science, [INTERVENTION [ASSESSMENT [PERCEPTION [OBSERVATION [INFORMATION = geographic]]]]], [SYSTEM [ORGANISATION [INFORMATION = geographic]]]]

geographically-coded data
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TYPE=]]]]

geological hazard
BE [[INTERVENTION [PRE-EVENT [ASSESSMENT =]]], [PROBABILITY [DISASTER [ORIGIN [NATURAL = geological]]]]]

georeferencing
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TYPE=]]]]

hazard
BE [PROBABILITY [DISASTER [DAMAGE [TARGET [LIFE, OBJECTS, ENVIRONMENT]]]]]

hazard analysis
ASSESS [DISASTER [TYPE, AREA], DAMAGE [TYPE, DEGREE, TARGET]]

hazard assessment
EVALUATE [DISASTER [DAMAGE [TARGET], [DEGREE]]]

hazard identification
IDENTIFY [DISASTER [TYPE], [DAMAGE [TYPE]]]

hazard map
BE OBJECT [PREEVENT [IDENTIFICATION [DISASTER [TYPE, AREA], [DAMAGE [TARGET, DEGREE]]]]]

hazard mapping
ACTION [CONSTRUCT (ORGANISATION hazard map)]

hazard probability
BE [PROBABILITY [DISASTER [DAMAGE [TARGET]]]]

hazard zone
BE [PROBABILITY [DISASTER [AREA, TYPE, DEGREE]]]

hazardous material
BE [PROBABILITY [DISASTER [TYPE =], [RISK SOURCE = material]]]

heat
BE [DISASTER [SPECIFICATIONS [TYPE=fire [SUBTYPE=]]]]

heavy oil
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

hydrograph
BE [PERCEPTION [ACTIVITY=*hydrograph*]]

hydrology
BE [PERCEPTION [INSTITUTION=*hydrology*]]

hydrological forecast
BE [PERCEPTION [ACTIVITY=*hydrological forecast*]]

hydrometeorology
BE [PERCEPTION [INSTITUTION=*hydrometeorology*]]

incident
HAPPEN [EVENT [SPECIFICATION [ORIGIN=man-made], [TYPE=], [AREA=], [TIME=], [INTENSITY=middle], [DAMAGE [TARGET=]]]

information system
RISK MANAGEMENT [IT [SYSTEM [WHOLE [TYPE=information system]]]]

information source
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TYPE=]]]]

land cover
ACT [INTERVENTION [RISK PREVENTION [TARGET [ENVIRONMENT=land]]]]

land degradation
ACT [INTERVENTION [RISK PREVENTION [EVENT [DAMAGE [TARGET [ENVIRONMENT=land]]]]]]

land management
ACT [INTERVENTION [RISK PREVENTION [METHOD=management], [TARGET [ENVIRONMENT=land]]]]

landslide

BE [[TYPE=flood [ERSCHEINUNGSFORMEN [ZEIT=, QUANTITY=, MOVEMENT=, UNDERGROUND=TYPE [BANK, SHORE], HORIZONTAL=, VERTIcAL= *landslide*]]], [PLACE=], [TIME=]], HAVE [CAUSE [TYPE=]], DAMAGE [TARGET=, SOURCE=, DEGREE=]], HAPPEN [STATES=, PROCESSES=]]

land use
ACT [ACTOR = authorities, [INTERVENTION [REDUCE [DISASTER [TYPE = floods]], [PROVIDE [RELIEF-WORK = non-physical measures/ land use planning]]]]

land use planning
PLAN [PRE-EVENT [ASSESSMENT [DATA][TARGET= population, country]]]

major accident
HAPPEN [EVENT [SPECIFICATION [ORIGIN=man-made], [TYPE=], [AREA=], [TIME=], [INTENSITY=high]], [DAMAGE [TARGET], [DEGREE=high]]]

major hazard
BE [PROBABILITY [DISASTER [DEGREE (extreme)]]]

major fire
BE [DISASTER [TYPE = mass fire], [AREA [EXTENT = high], [DEGREE/INTENSITY = extreme]]

man-made disaster
BE [DISASTER [CAUSE [ORIGIN=man made]]]BE [DISASTER [CAUSE [ORIGIN=natural]]]

man-made hazard
BE [PROBABILITY [DISASTER [CAUSE [ORIGIN=man-made]]]]

maximum flood discharge
BE [DISASTER [TYPE = floods], [PROPERTY = water level peak]]

maximum probable flood
BE [DISASTER [TYPE = flood], [PROBABILITY =], [DEGREE = maximum]]

metadata
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TYPE=]]]]

mudflow
BE [[TYPE=flood [ERSCHEINUNGSFORMEN [ZEIT=, QUANTITY=, MOVEMENT=, UNDERGROUND=TYPE [BANK, SHORE], HORIZONTAL=, VERTICAL= *mudflow*]]], [PLACE=], [TIME=]], HAVE [CAUSE [TYPE=]], DAMAGE [TARGET=, SOURCE=, DEGREE=]], HAPPEN [STATES=, PROCESSES=]]

natural disaster
BE [PROBABILITY [DISASTER [CAUSE [ORIGIN=naturall event]]]]

natural hazard
BE [[INTERVENTION [PRE-EVENT [ASSESSMENT =]]], [PROBABILITY [DISASTER [ORIGIN [NATURAL =]]]]]

non-structural flood mitigation
ACT [ACTOR = authorities, [INTERVENTION [PREVENTION [REDUCE [DISASTER [TYPE = floods], [IMPACT =]]]], PROVIDE [RELIEF-WORK = non-physical measures (e.g. land-use planning, flood plain zoning, advance warning system, flood insurance]]

offshore drilling
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill], [AREA/REGION=], [RISK SOURCE=]]]

ontology
RISK MANAGEMENT [IT [SYSTEM [CONTENT [TYPE=]]]]

oil dispersant
BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTIVITIES/PHASES [REACTING [OPERATIONS [INSTRUMENTS=]]]]]]]

oil platform
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill], [AREA/REGION=], [RISK SOURCE=]]]

oil pollution fighter
COMBAT [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTIVITIES/PHASES [REACTING [LIMITATION=]]]]]]

oil slick
BE [DISASTER [AREA/REGION [SPATIAL EXTENT=]]]

oil spill
BE [DISASTER [TYPE=], [ORIGIN=man-made]]

operations
BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTOR(S)], [ACTIVITIES/PHASES [RISK DETECTING [OPERATIONS], [REACTING [OPERATIONS], [REBUILDING [OPERATIONS]]]]]]]

petroleum
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

pipeline
BE [DISASTER [SPECIFICATIONS [AREA/REGION=], [RISK SOURCE=]]]

population at risk
BE [DISASTER [TYPE =], DAMAGE [TARGET = human], [REGION =]]

pour point
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

precaution
BE [PRE-EVENT [ASSESSMENT [OBJECT [DATA] [TARGET= human, environment]]]]

precipitation
BE [PREPAREDNESS [CONTROL [ACTIVITY [MESURE [ACTOR=, OBJECT=*precipitation*, INSTRUMENT=, RESULT=]]]]]

precipitation gauge
BE [PREPAREDNESS [CONTROL [ACTIVITY [MESURE [ACTOR=, OBJECT=, INSTRUMENT=*precipitation gauge*, RESULT=]]]]]

precipitation intensity
BE [PREPAREDNESS [CONTROL [ACTIVITY [MESURE [ACTOR=, OBJECT=, INSTRUMENT=, RESULT=*precipitation intensity*]]]]]

precipitation station
BE [PREPAREDNESS [CONTROL [ACTIVITY

[PLACE=*precipitation station*]]]]

precision farming
ACT [INTERVENTION [RISK PREVENTION [METHOD=management], [TARGET [ENVIRONMENT=farming]]]]

prevention
ACT [PRE-EVENT [PREVENTION [AVOIDANCE [PROBABILITY [DISASTER [DAMAGE [RISK SOURCE=, DEGREE=, TARGET=, CONSEQUENCES=]], [MINIMIZE [PROBABILITY [DISASTER]]]]]]]]

protection
ACT [PRE-EVENT [REDUCE [PROBABILITY [DISASTER [DAMAGE [RISK SOURCE=, DEGREE=, TARGET=, CONSEQUENCES=]]]]]]

public risk awareness
INFORM [DATA [ACTOR= authorities, operators], TARGET=public/general population [REDUCE [RISK], [DISASTER]]]]

public information
INFORM [PRE-EVENT [ASSESSMENT [COMMUNICATION [DATA], [ACTOR=authorities, operators, TARGET= public]]]]

rainfall intensity
BE [PREPAREDNESS [CONTROL [ACTIVITY [MESURE [ACTOR=, OBJECT=, INSTRUMENT=, RESULT=*rainfall intensity*]]]]]

reduction of high-water level
ACT [ACTOR = authorities, operators, [INTERVENTION [REACTION [REDUCE [DISASTER [TYPE = floods], [STATE = water level]]]]]]

refinery
BE [DISASTER [SPECIFICATIONS [AREA/REGION=], [RISK SOURCE=]]]

reflectance
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD=satellite]]]]]

remote sensing
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD=remote sensing]]]]]

rescue
MITIGATE [ACTOR=, DAMAGE [TARGET=, DEGREE=]]

residual risk
BE SITUATION [[PROBABILITY [DISASTER]] + PREVENT [PROBABILITY [DISASTER]]]

resilience
ACT [INTERVENTION [RISK PREVENTION [TARGET [ENVIRONMENT=nature]]]]

resolution
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD=satellite]]]]]

response
ACT [ACTOR=authorities [INTERVENTION [RESCUE [DAMAGE [TARGET=], [TIME [TIME OF OCCURRENCE=]]]]]]

response plan
REPRESENT [INTERVENTION [REACTION =], [DISASTER [IN-EVENT =]]]

risk
BE [DANGER [DAMAGE [SOURCE=], DEGREE=], TARGET=], COSTS=]]]

risk acceptance
TOLERATE [ACTING [ACTORS, SITUATION=risk]]

risk analysis
ASSESS [PROBABILITY [DISASTER [TYPE, DAMAGE [TYPE, DEGREE]]]]

risk assessment
EVALUATE [PROBABILITY [DISASTER [DAMAGE]]]

risk communication
COMMUNICATE [ACTORS, DATA/INFORMATION [PROBABILITY/ VULNERABILITY [DISASTER]]]

risk management
ACTION [ACTORS, DATA/INFORMATION [PROBABILITY/ VULNERABILITY [DISASTER]]]

risk map
BE [OBJECT [PREEVENT [IDENTIFICATION [PROBABILITY [DISASTER]]]]]

risk mapping
ACTION [CONSTRUCT [OBJECT=risk map]]

risk reduction
ACTION [PREEVENT [MINIMIZATION [PROBABILITY [DISASTER]]]]

safety
BE NOT [PROBABILITY [DISASTER [DAMAGE]]]

safety report
REPRESENT [INTERVENTION [ACTOR =], [OBJECT [RISK ANALYSIS [PROBABILITY [DAMAGE]]]]]

satellite
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD=satellite], [SATELLITE-INFO=]]]]]

secondary hazard
BE [DISASTER [CONSEQUENCE = disaster]]

self-initiated fire prevention
ACT [ACTOR [PROBABILITY [DISASTER [TARGET = people],[INTERVENTION [PREVENTING [PROBABILITY [DISASTER [TYPE = fire]]]]]]

semantic web
RISK MANAGEMENT [IT [SYSTEM [CONTENT [ORGANISATION/STRUCTURE=]]]]

skimmer
BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTIVITIES/PHASES [REACTING [OPERATIONS [INSTRUMENTS=]]]]]]]

sludge
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

smoke
BE [DISASTER [SPECIFICATIONS [TYPE=fire [SUBTYPE=]]]]

software

RISK MANAGEMENT [IT [SYSTEM [TOOLS=]]]

spatial analysis
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD [EVALUATING [SATELLITE-INFO=spatial]]]]]]]

spatial information
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [SATELLITE-INFO=spatial]]]]]

spatial resolution
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD=satellite]]]]]

specific gravity
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

spectral resolution
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD=satellite]]]]]

spectral signature
ACT [INTERVENTION [RISK ASSESSMENT [PERCEPTION [OBSERVATION [METHOD=satellit], [SATELLITE-INFO=signature]]]]]

stage gauge
BE [PREPAREDNESS [CONTROL [ACTIVITY [MESURE [ACTOR=, OBJECT=, INSTRUMENT=, RESULT=*stage gauge*]]]]]

stakeholder
BE [RISK MANAGEMENT [CONTENT [INTERVENTION [ACTORS=]]]]

structural flood mitigation
ACT [ACTOR = authorities, [INTERVENTION [PREVENTION [REDUCE [DISASTER [TYPE = floods], [IMPACT =]]]], PROVIDE [RELIEF-WORK = physical measures (e.g. reservoirs, levees, dredging, diversions, flood proofing]]

subsidence
ACT [INTERVENTION [RISK PREVENTION [TARGET [ENVIRONMENT=land]]]]

sustainability
ACT [INTERVENTION [RISK PREVENTION [METHOD [TYPE=sustainable]]]]

sustainable development
DEVELOP [PREVENTION [ACTOR=authorities, operators] LIMITATION [PROBABILITY [DANGER [DAMAGE [RISK SOURCE=, DEGREE=, TARGET=, CONSEQUENCES=]]]]]

sustainable flood risk management
ACT [ACTOR [REDUCE [PROBABILITY [DAMAGE [DISASTER [TYPE = flood],
[RESPONSE [DISASTER [TYPE = flood]]]]

tanker
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill] [AREA/REGION [LOCATION=]], [RISK SOURCE=]]]

tidal bore
BE [[TYPE=flood [ERSCHEINUNGSFORMEN [ZEIT=, QUANTITÄT=, BEWEGUNG=, UNTERGRUND=TYPE [UFER, KÜSTE], HORIZONTAL= *tidal bore*, VERTIKAL=]]], [PLACE=], [TIME=]],
HAVE [CAUSE [TYPE=]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]],
HAPPEN [STATES=, PROCESSES=]]

torrent control
BE [[TYPE=flood [ERSCHEINUNGSFORMEN [ZEIT=, QUANTITÄT=, BEWEGUNG=, UNTERGRUND=TYPE [UFER, KÜSTE], HORIZONTAL=, VERTIKAL= *Sturzflut, -bach*]]], [PLACE=], [TIME=]],
HAVE [CAUSE [TYPE=]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]],
HAPPEN [STATES=, PROCESSES=]]

tsunami
BE [[TYPE=flood [ERSCHEINUNGSFORMEN [ZEIT=, QUANTITÄT=, BEWEGUNG=, UNTERGRUND=TYPE [UFER, KÜSTE], HORIZONTAL= *tsunami*, VERTIKAL=]]], [PLACE=], [TIME=]],
HAVE [CAUSE [TYPE=]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]],
HAPPEN [STATES=, PROCESSES=]]

ventilation
BE [DISASTER [SPECIFICATIONS [TYPE=fire [SUBTYPE=]]]]

viscosity
BE [DISASTER [SPECIFICATIONS [TYPE=oil spill [SUBTYPE=]]]]

vulnerability
BE [DISASTER [DAMAGE [TARGET=sensible for damage]]]

vulnerability analysis
IDENTIFY [PREEVENT [DISASTER [DAMAGE [TARGET=sensible for damage]]]]

water-level monitoring
ACT [ACTOR = science, authorities, [INTERVENTION [REACTION [CONTROL/ MONITORING [OBJECT = water level]]]]]

water management
ACT [PRE-EVENT [PROTECTION [PROBABILITY [DAMAGE [SOURCE= water/floods]]]]]

wave
BE [[TYPE=flood [ERSCHEINUNGSFORMEN [ZEIT=, QUANTITÄT=, BEWEGUNG=, UNTERGRUND=TYPE [UFER, KÜSTE], HORIZONTAL= *wave*, VERTIKAL=]]], [PLACE=], [TIME=]],
HAVE [CAUSE [TYPE=]],
DAMAGE [TARGET=, SOURCE=, DEGREE=]],
HAPPEN [STATES=, PROCESSES=]]

wave length
ACT [ACTOR = sience, [INTERVENTION [REACTION [CONTROL [DETERMINE [DISASTER [TYPE = floods], [STATE = wavelength / x]]]]]]

3 THE HYPERTEXT TOOL

3.1 INTENTION AND ACCESS

The SERRMO-representation is transformed into a hypertext tool. Hypertext means the organization of information in terms of small packages which are linked according to the purpose of the tool. The purpose of the MULTH hypertext is to support experts in their risk communication work. It provides the possibilities of

i) looking for the semantic networks that are transferred from the frames and finding some lexical expressions of the glossary which are defined according to these concepts (via *network structure*)

ii) looking for a particular lexical term and finding the relevant semantic networks (via *list of terms*)

Access and use is possible by:

www.tu-chemnitz.de/phil/al/WIN-MULTH

3.2 HYPERTEXT BASIS (COMPONENTS)

The hypertext tool provides both the use of SERRMO (via *SERRMO hypertext*) as well as some information on SERRMO (*SERRMO theory/data*) including information on the semantics and the frames that are applied. Figure 2 represents the Homepage of the SERRMO-module.

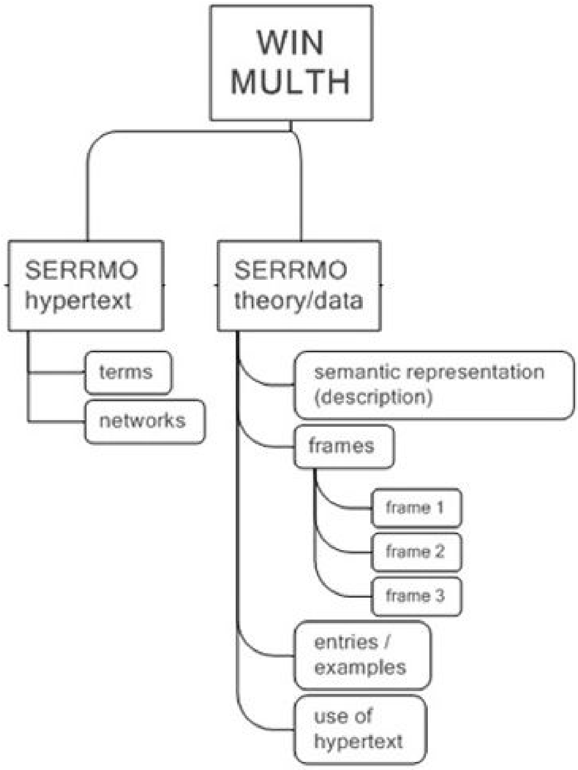


Figure 2: Homepage Hypertexttool MULTH

3.3 STARTING FROM *TERMS*

The lexical expressions are alphabetically ordered and collected in groups of the first letter.

The klick on a selected term opens the network of the semantic representation. This is organized in a step-by-step format. Thus the user decides how deep he/she wants to enter the whole network: each node is supplied with an arrow that changes the colour after the visit. This procedure is demonstrated in the following screenshot examples for the term *biodiversity* (Figure 3):

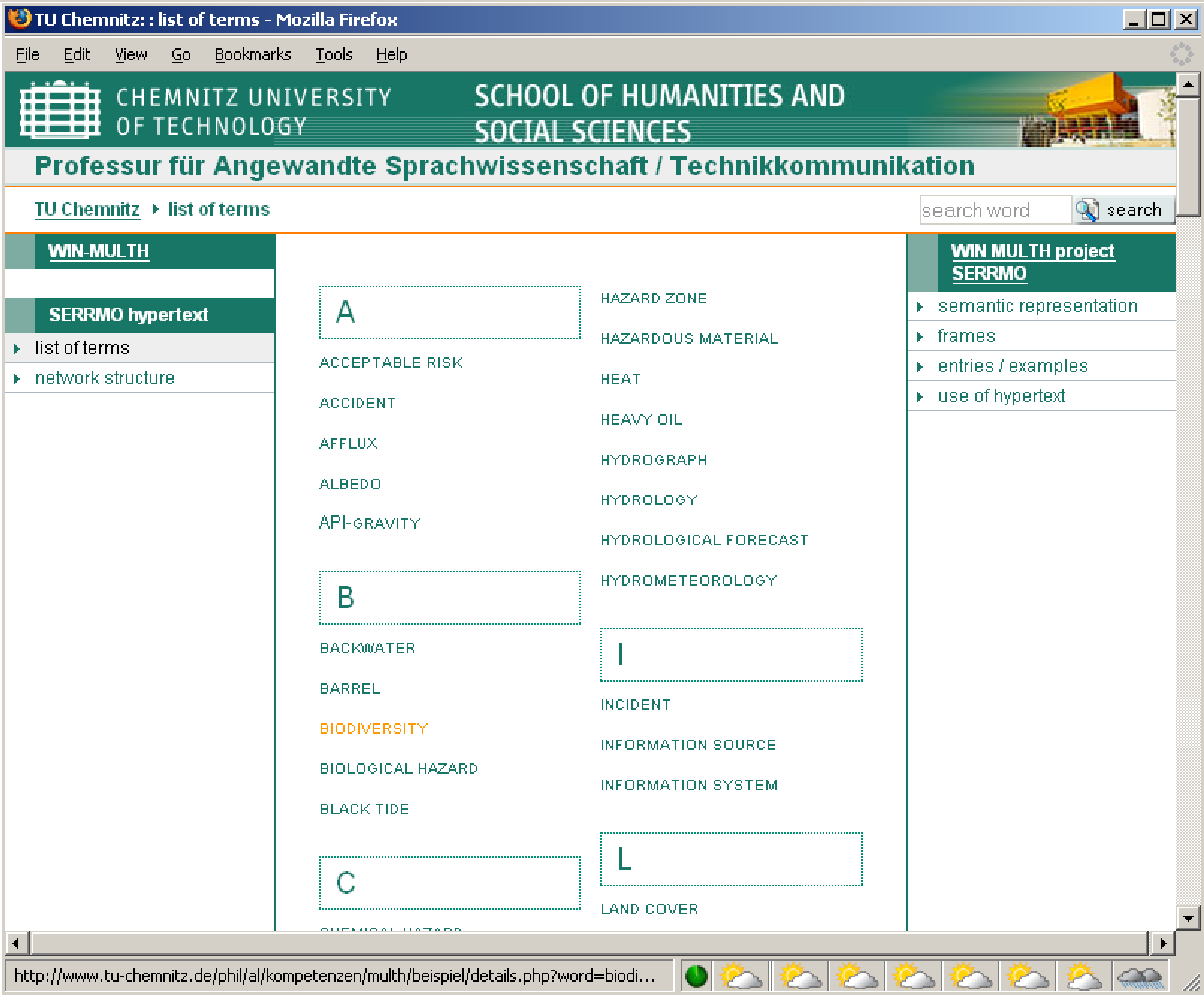
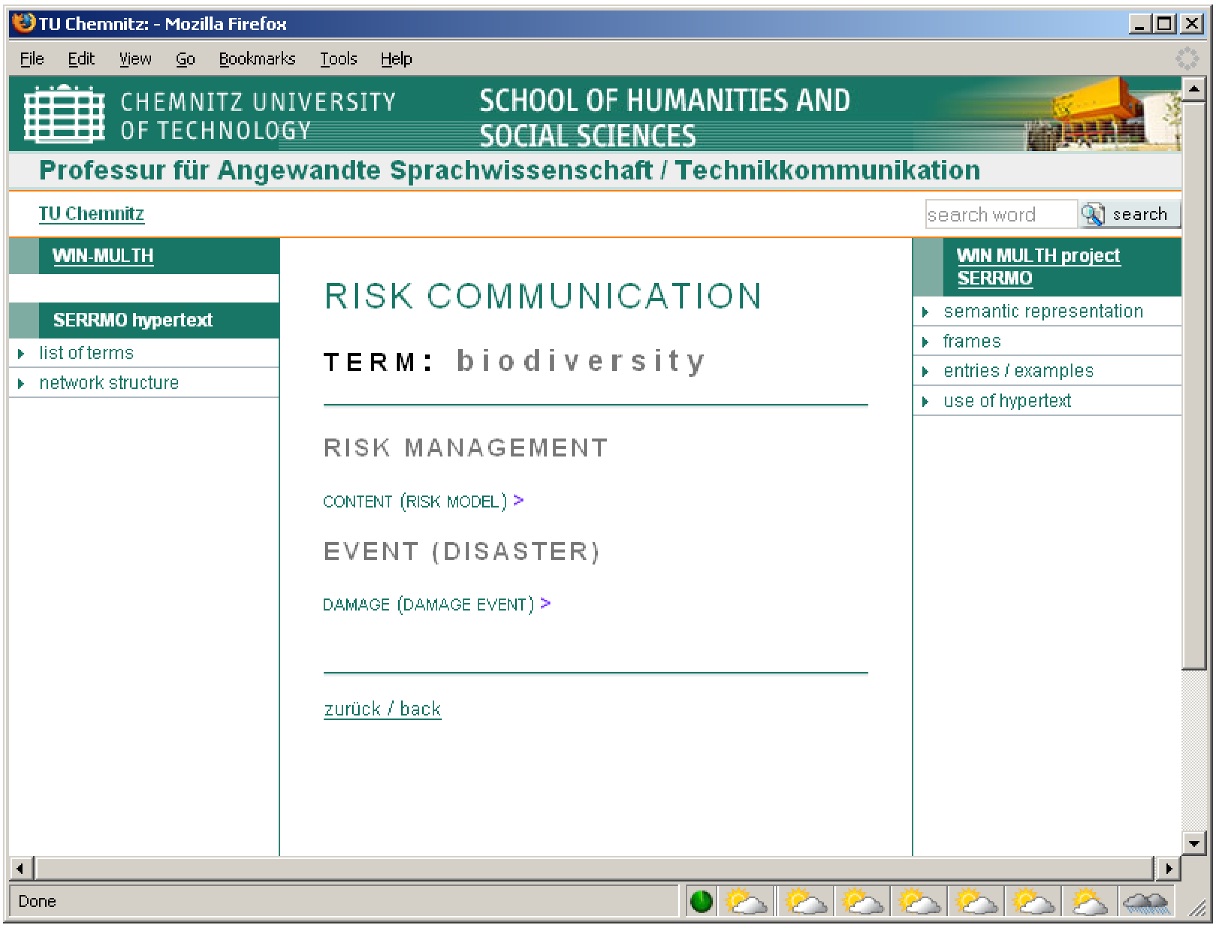


Figure 3a: list of terms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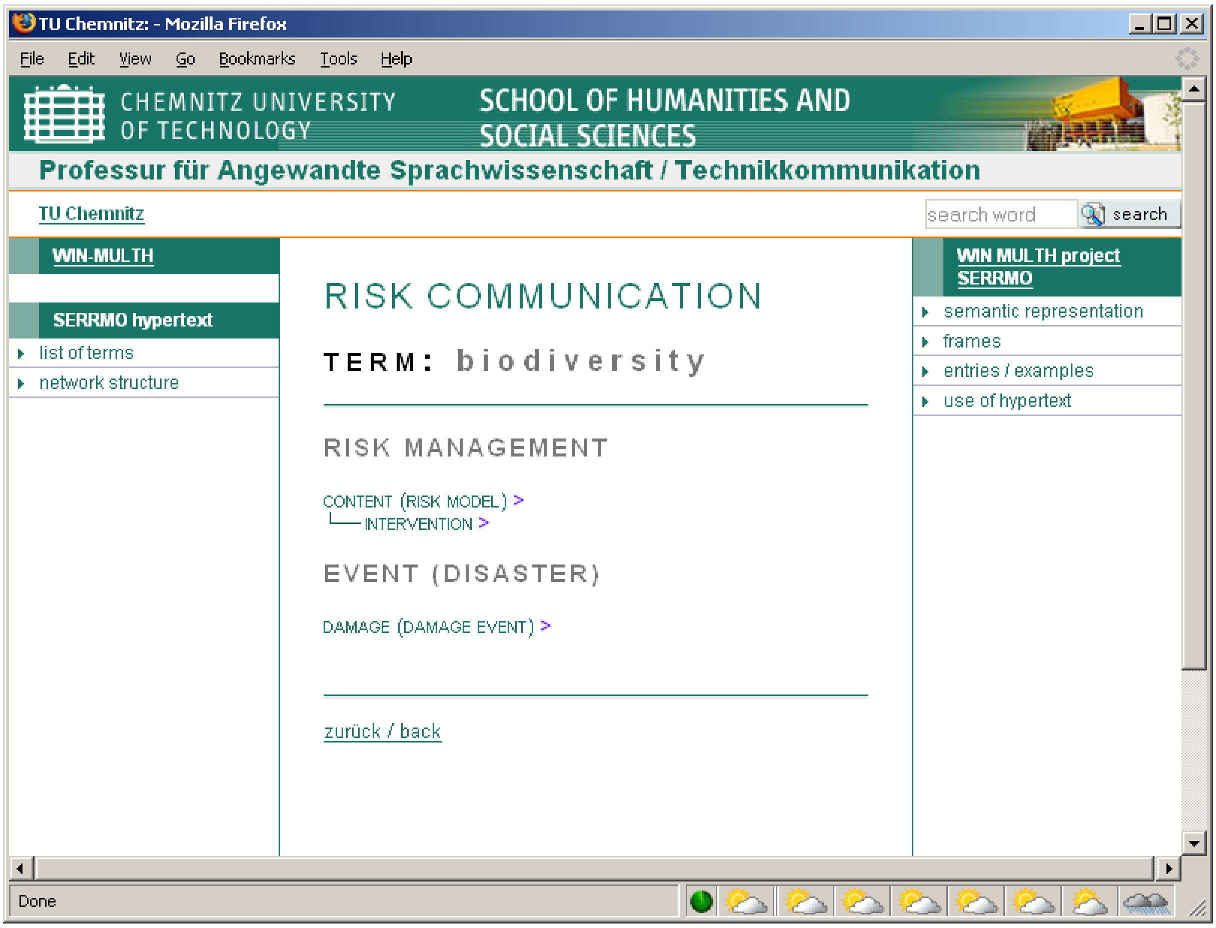
search word
search
WIN-MULTH
SERRMO hypertext
list of terms
network structure
RISK COMMUNICATION
TERM: biodiversity
RISK MANAGEMENT
CONTENT (RISK MODEL) >
EVENT (DISASTER)
DAMAGE (DAMAGE EVENT) >
zurück / back
WIN MULTH project SERRMO
semantic representation
frames
entries / examples
use of hypertext
Done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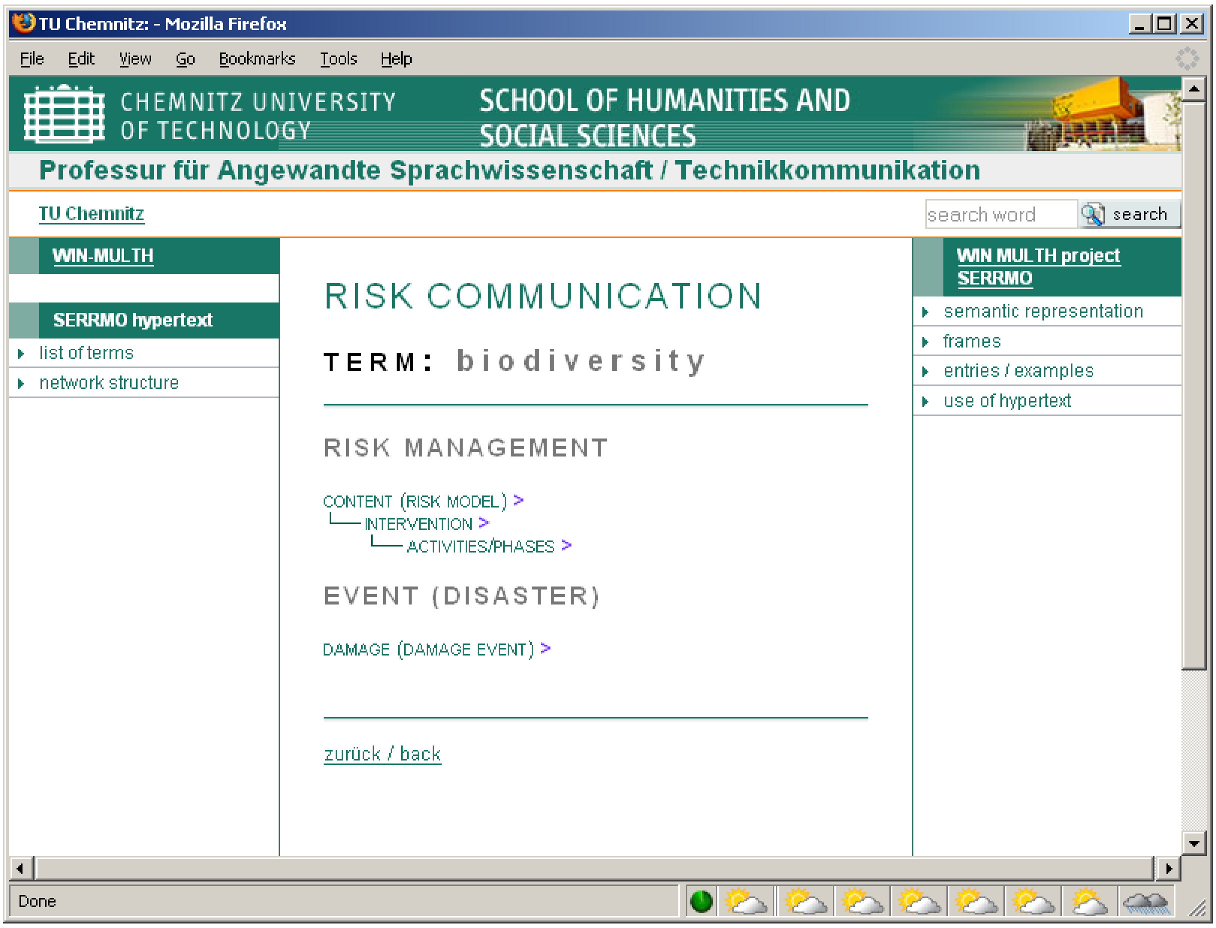
SERRMO hypertext
list of terms
network structure
RISK COMMUNICATION
TERM: biodiversity
RISK MANAGEMENT
CONTENT (RISK MODEL) >
INTERVENTION >
EVENT (DISASTER)
DAMAGE (DAMAGE EVENT) >
zurück / back
WIN MULTH project SERRMO
semantic representation
frames
entries / examples
use of hypertext
Done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INTERVENTION >
ACTIVITIES/PHASES >
EVENT (DISASTER)
DAMAGE (DAMAGE EVENT) >
zurück / back
WIN MULTH project SERRMO
semantic representation
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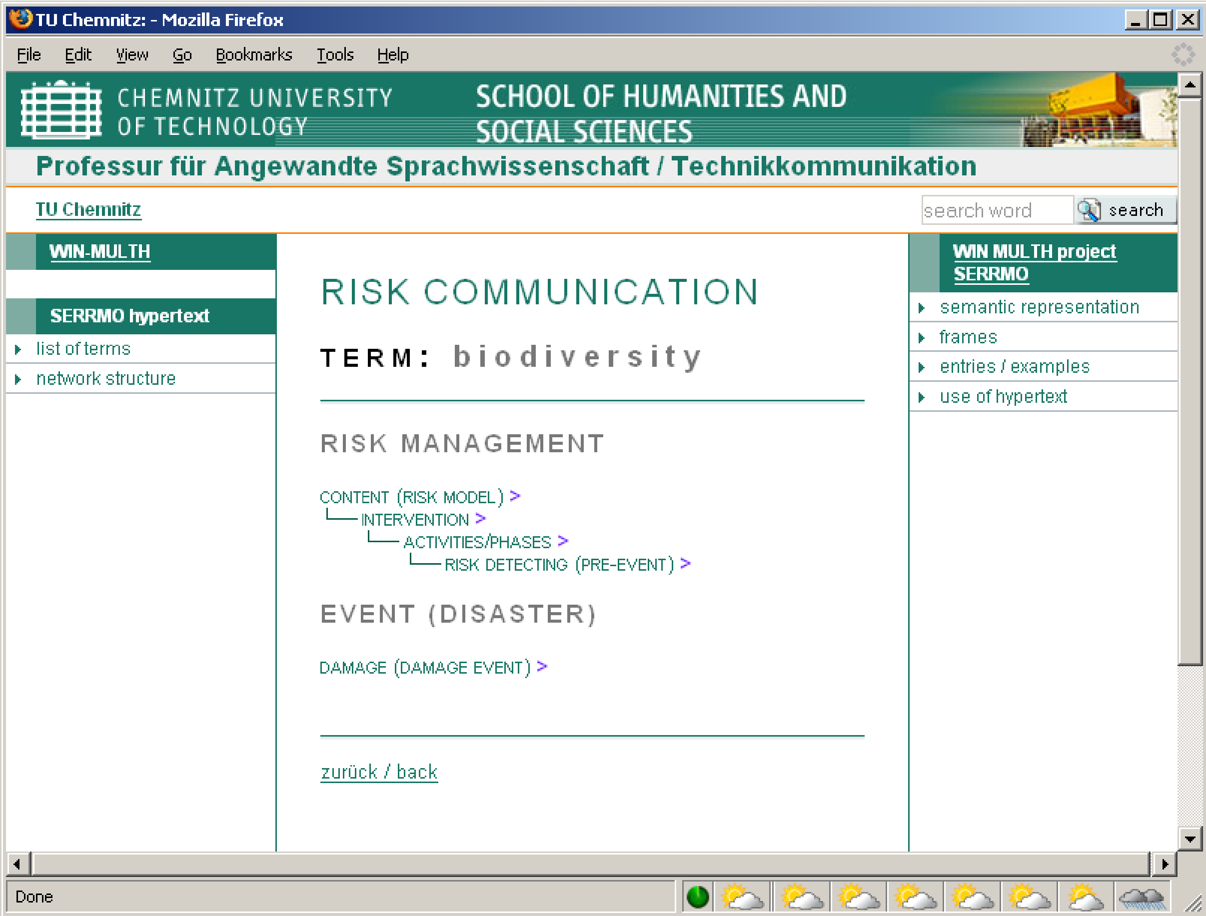
Done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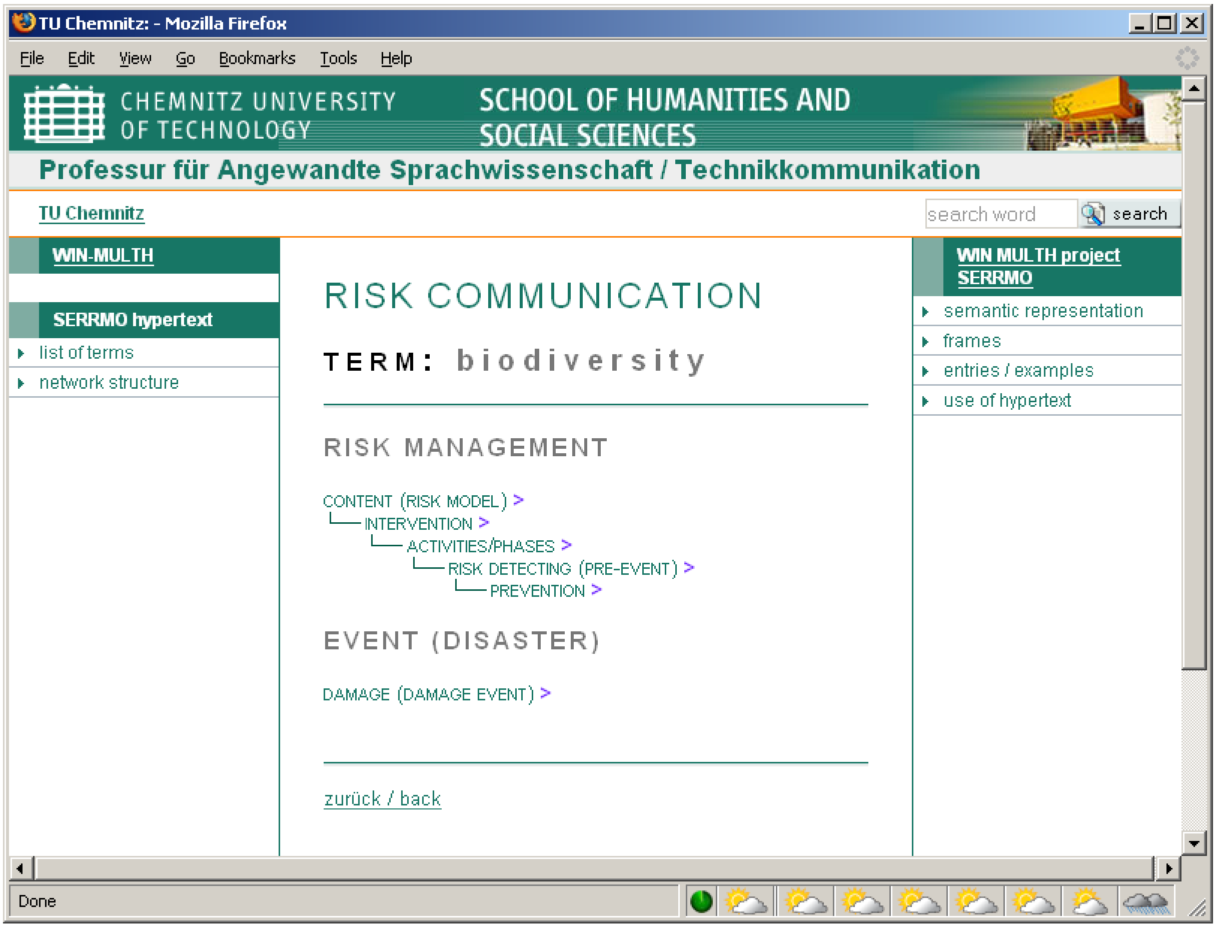
TERM: biodiversity
RISK MANAGEMENT
CONTENT (RISK MODEL) >
INTERVENTION >
ACTIVITIES/PHASES >
RISK DETECTING (PRE-EVENT) >
EVENT (DISASTER)
DAMAGE (DAMAGE EVENT) >
zurück / back
WIN MULTH project SERRMO
semantic representation
frames
entries / examples
use of hypertext
Done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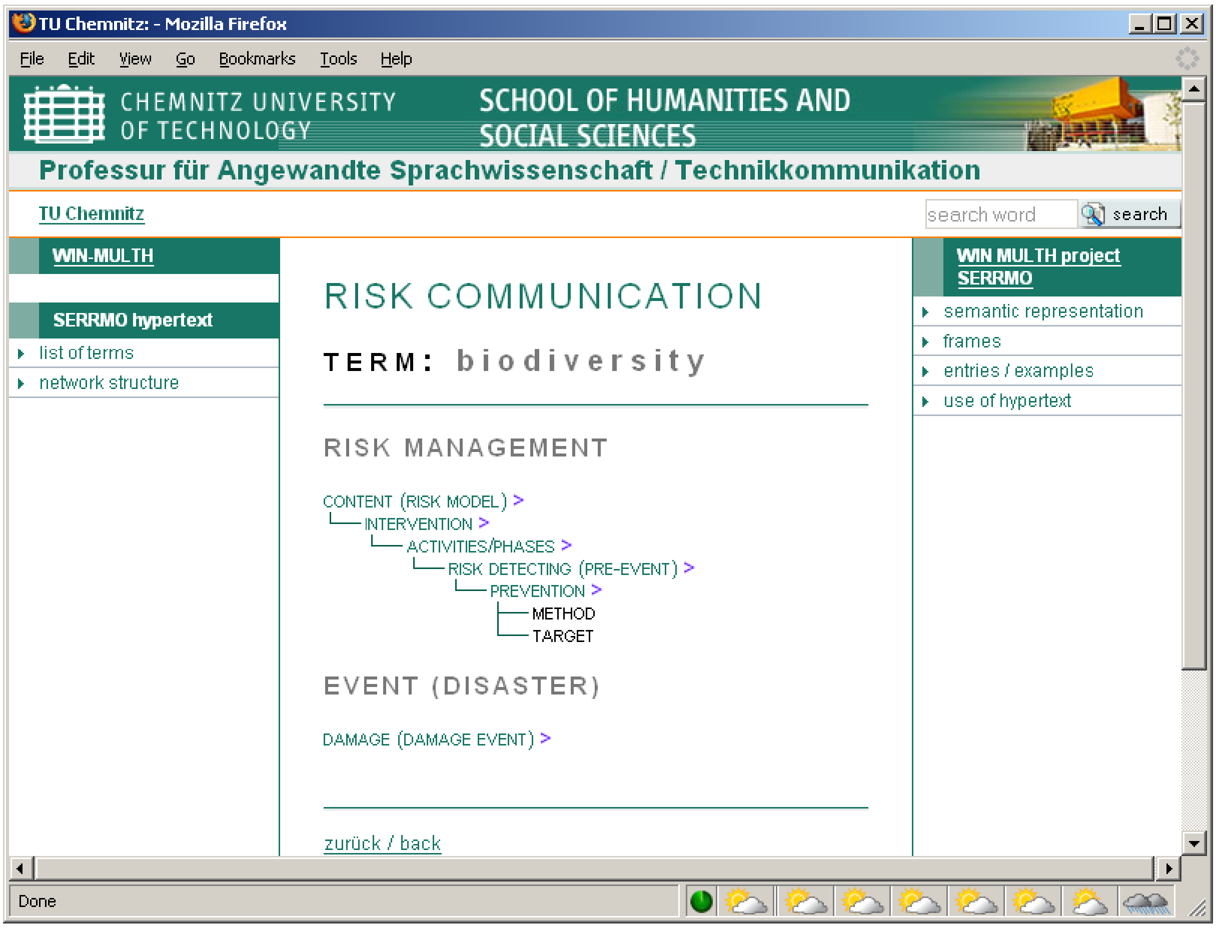
CONTENT (RISK MODEL) >
INTERVENTION >
ACTIVITIES/PHASES >
RISK DETECTING (PRE-EVENT) >
PREVENTION >
EVENT (DISASTER)
DAMAGE (DAMAGE EVENT) >
zurück / back
WIN MULTH project
SERRMO
semantic representation
frames
entries / examples
use of hypertext
Done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SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
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search word
search
WIN-MULTH
SERRMO hypertext
list of terms
network structure
RISK COMMUNICATION
TERM: biodiversity
RISK MANAGEMENT
CONTENT (RISK MODEL) >
INTERVENTION >
ACTIVITIES/PHASES >
RISK DETECTING (PRE-EVENT) >
PREVENTION >
METHOD
TARGET
EVENT (DISASTER)
DAMAGE (DAMAGE EVENT) >
zurück / back
WIN MULTH project SERRMO
semantic representation
frames
entries / examples
use of hypertext
Done

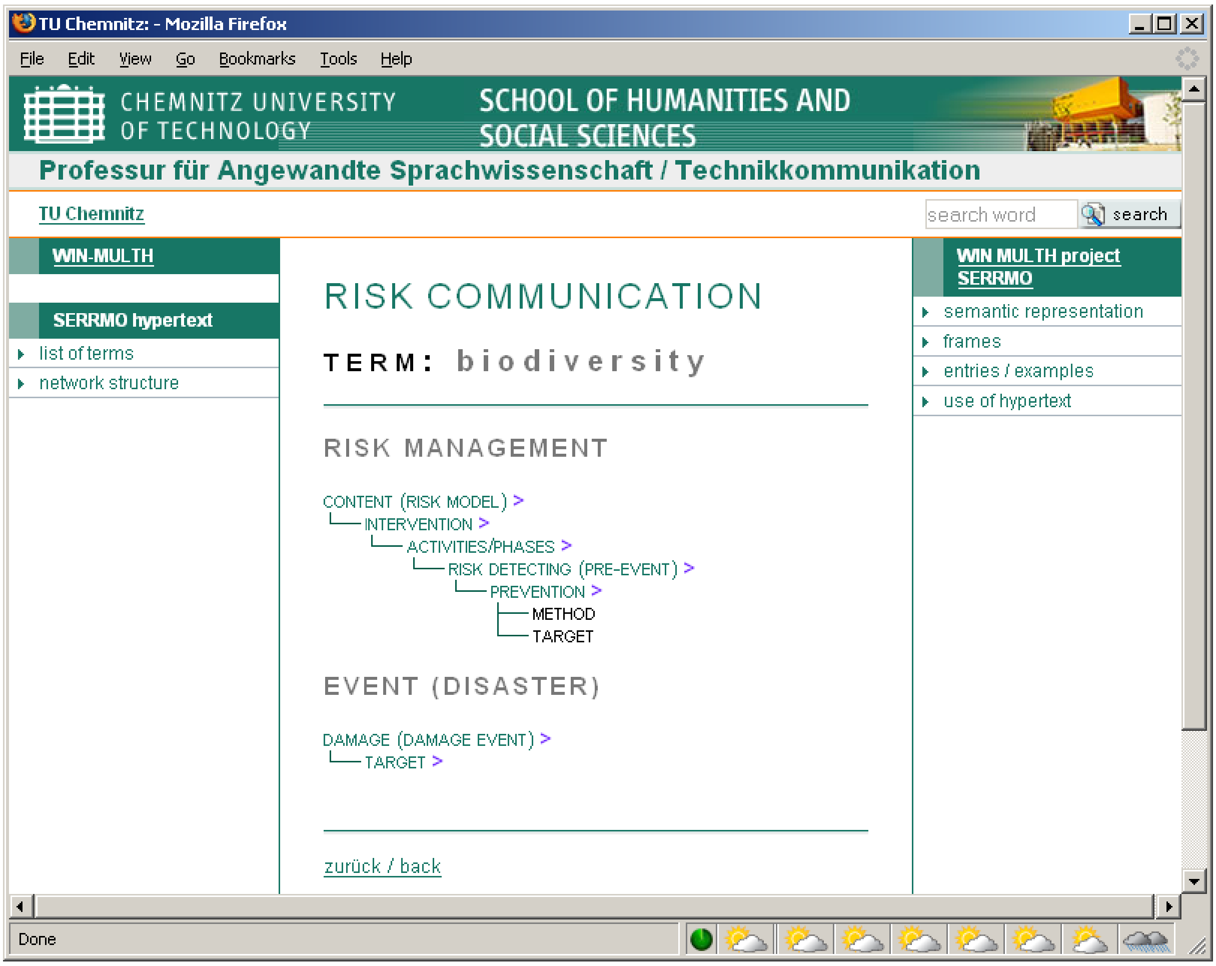

Figure 3b: development of the semantic network

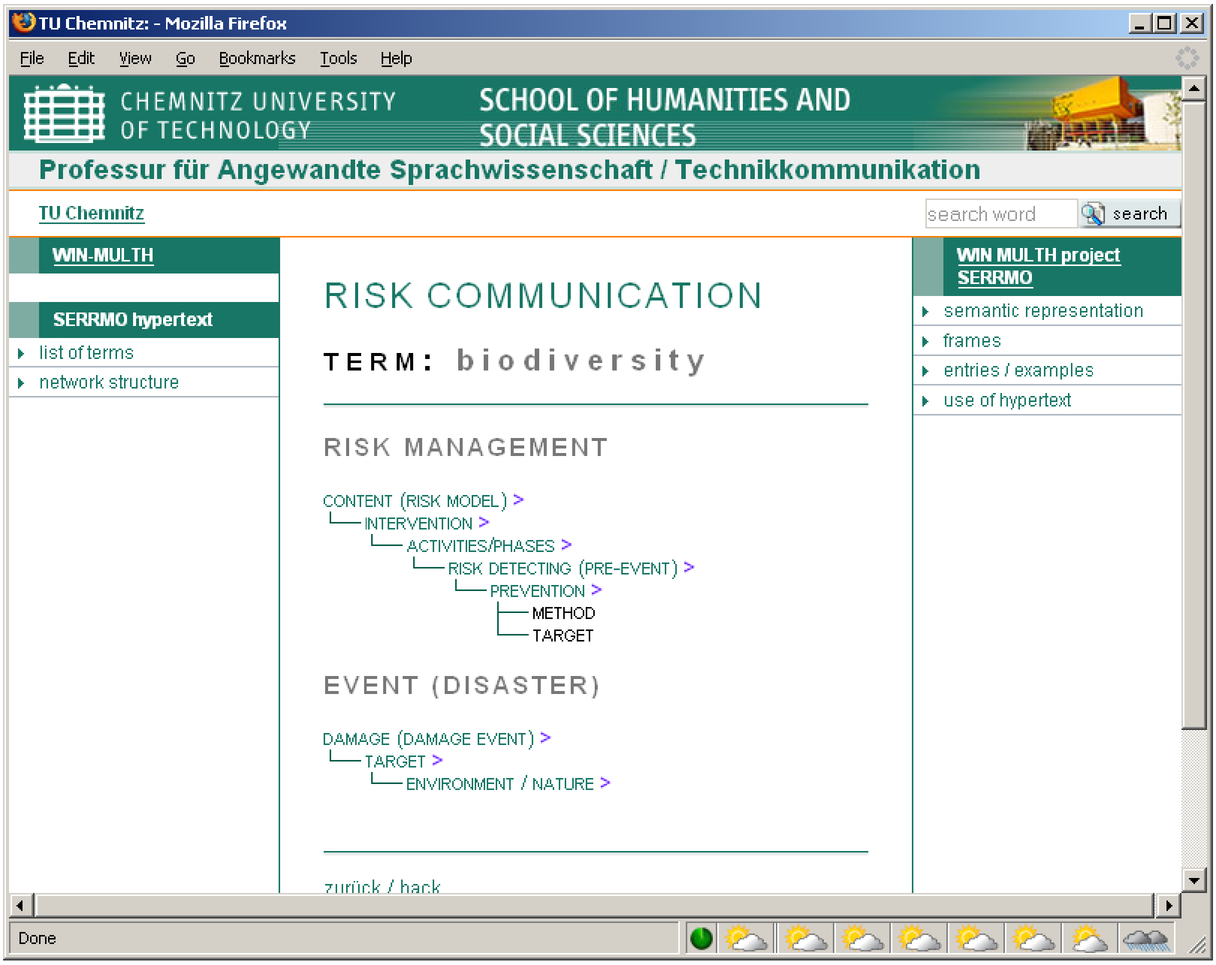

Figure 3c: further development of the semantic network

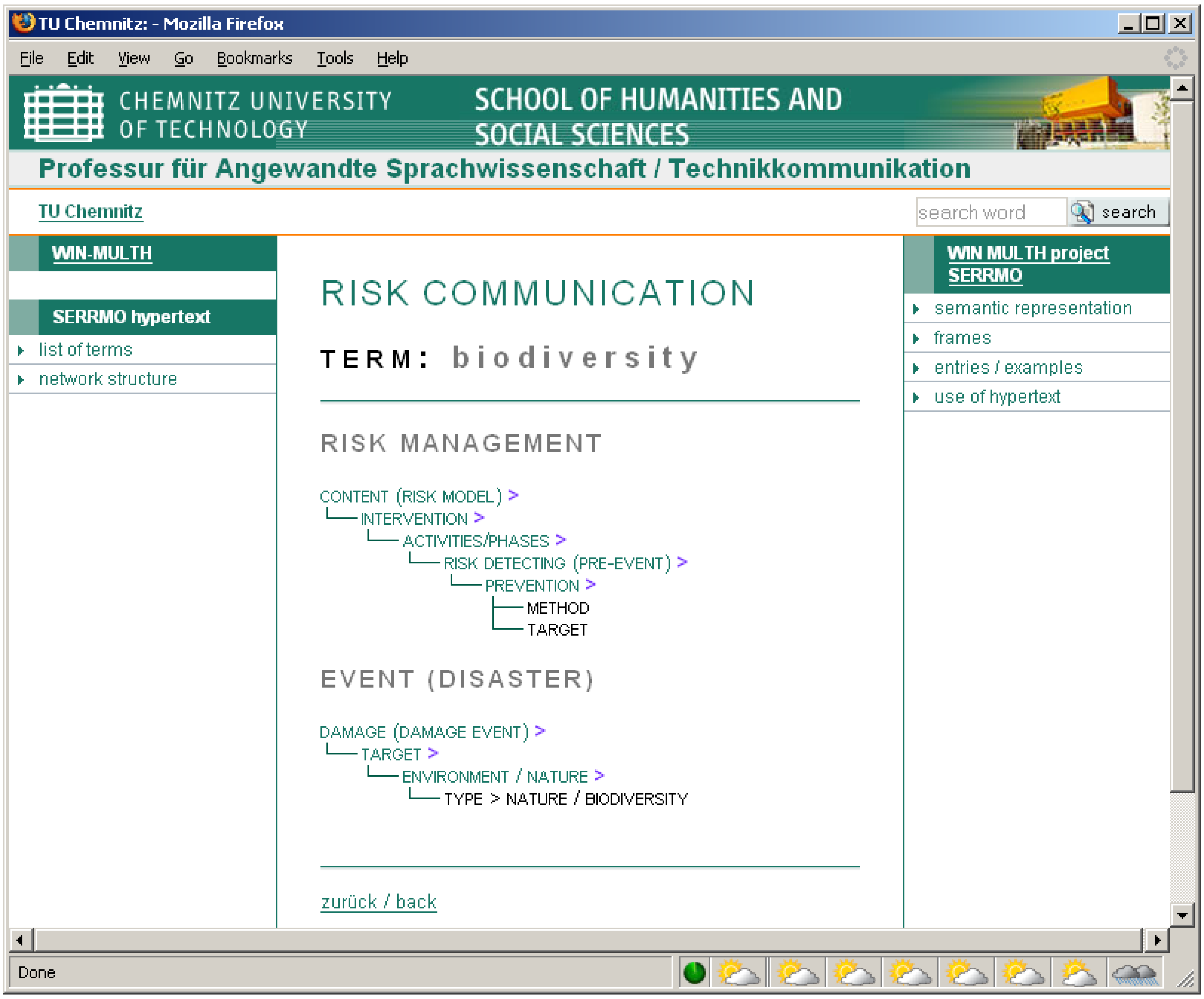

Figure 3d: completed presentation of the network

3.4 STARTING FROM THE *NETWORKS*

The second possibility to use the hypertext is to start from the network as a whole one. Also in this procedure the step-by-step format is applied. In the beginning the general network is offered in terms of red dots tat can be opened one after the other. On the level of more complexity the frames are presented in terms of fragments that can be expanded according to the complexity of the concerned frames (see sections 2.2, 2.3, 2.4). In a reversed view the user can continue from the nodes/categories to the terms that are marked by these categories. The idea is presented in the following network fragments that are the basis for the selection of inventories of terms within a network:

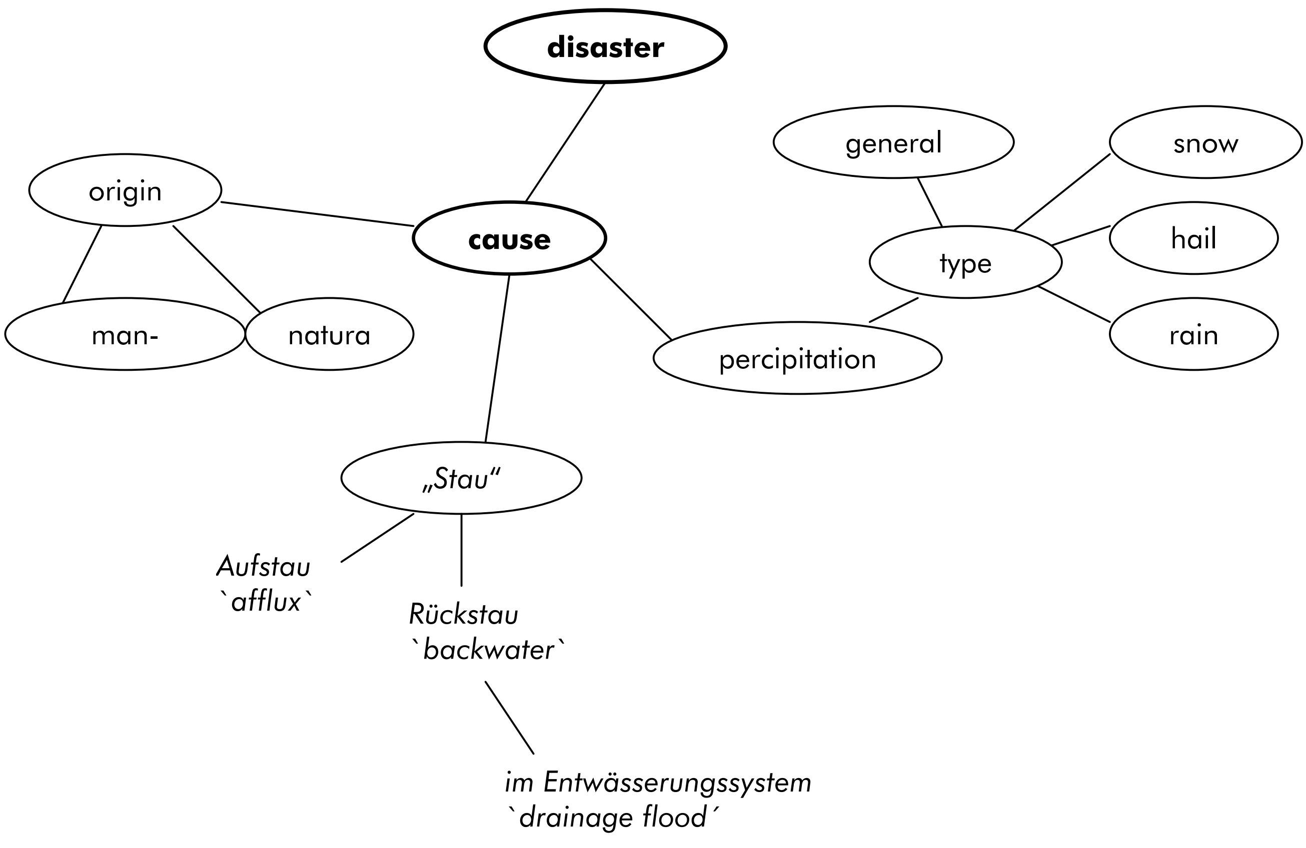

Figure 4: *afflux* and *backwater* within the network [DISASTER [CAUSE]]

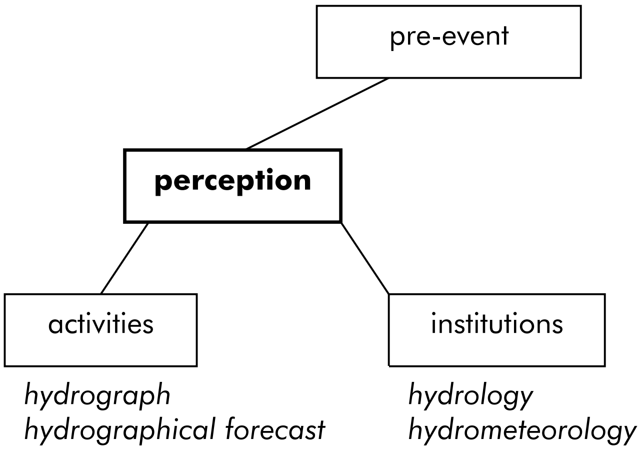

Figure 5: Some terms within the net [INTERVENTION [PRE-EVENT [PERCEPTION]]]

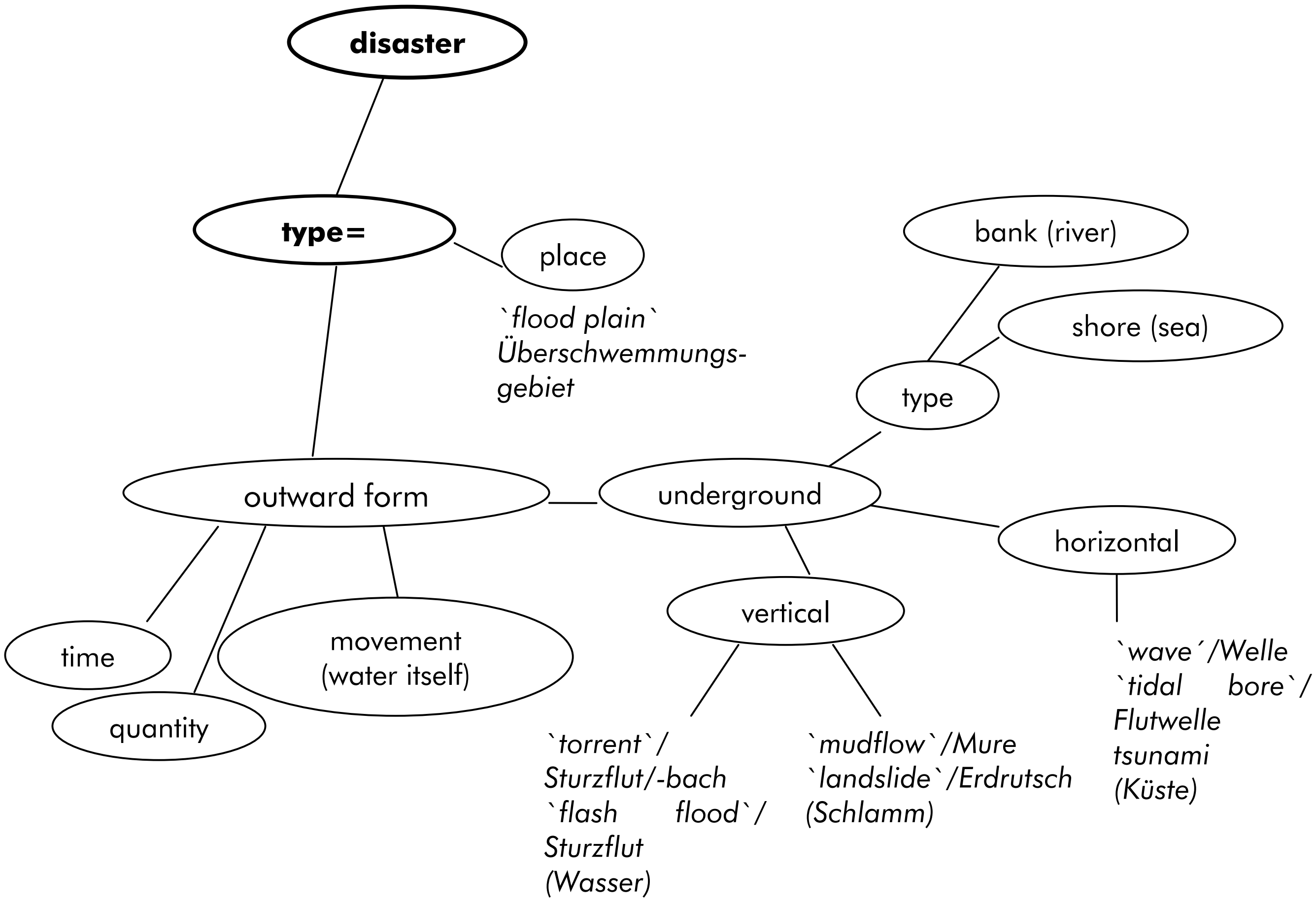

Figure 6: *flood plain, wave, tidal bore* within the network [DISASTER [TYPE = flood [PLACE], [OUTWARD FORM [UNDERGROUND [VERTCAL, HORIZONTAL]]]]]

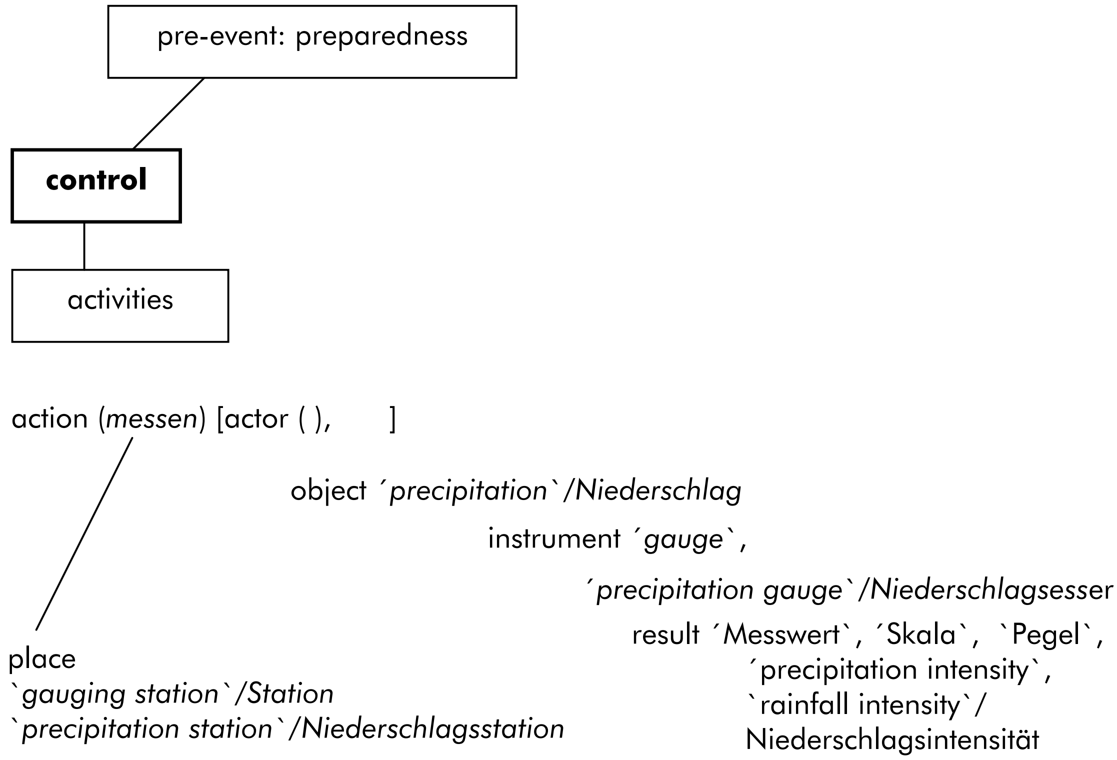

Figure 7: *gauge* and *gauging station* within the network of [INTERVENTION [IN-EVENT [CONTROL [ACTIVITIES [ACTOR], [ACTIONS]]]]]

4 THE ROLE OF THE HYPERTEXT TOOL WITHIN THE FRAMEWORK OF THE THESAURUS

SERRMO adopts the list of lexical entries (terms) and the macro-structure as it is conceived for MULTH in the glossary (lexicological part). It also profits of the terminological part by selecting the semantic categories from selected definitions. Additionally some selected analyses from the corpus (discourse types of science, administration, media) are used for constructing and for elaborating the frames.

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