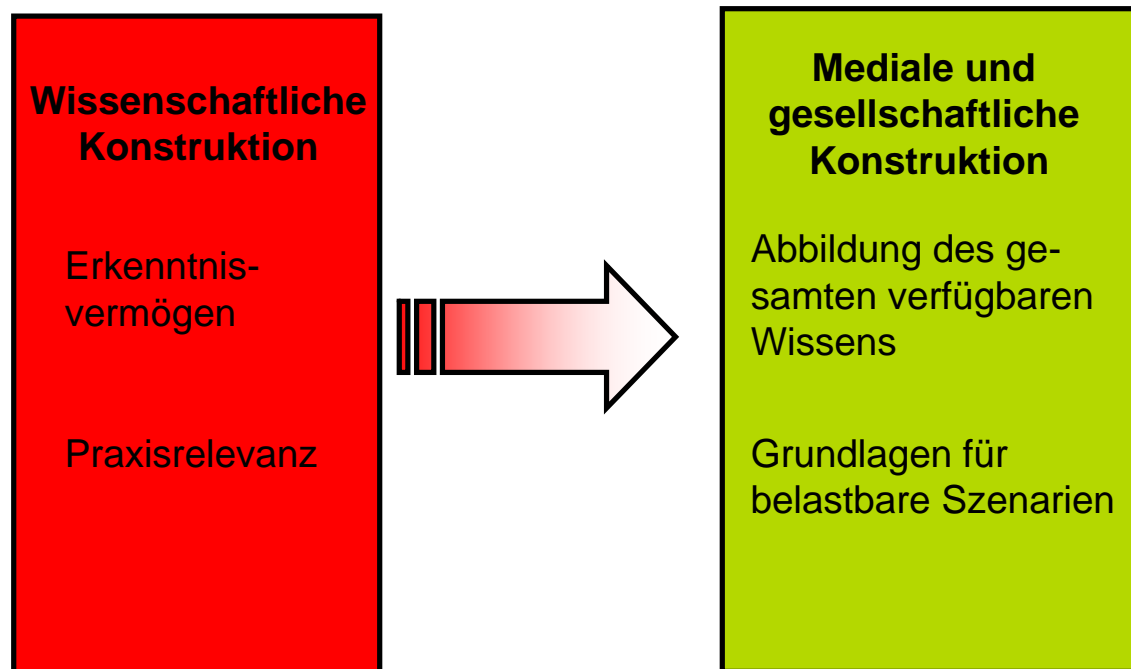


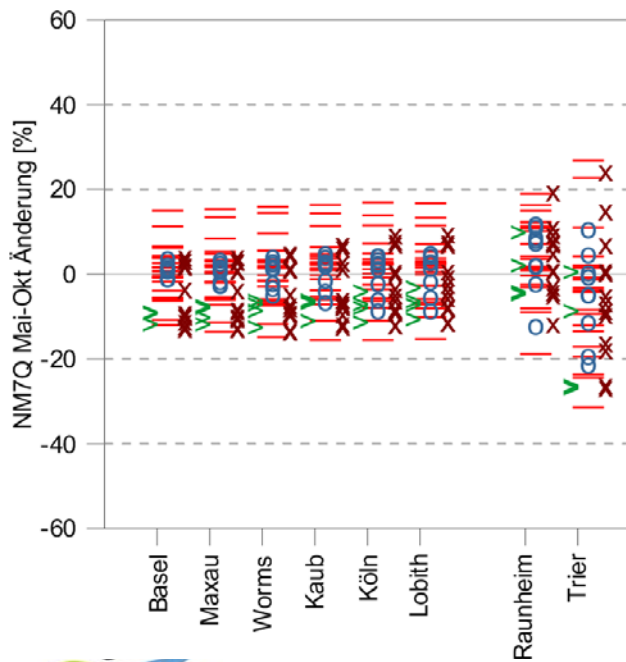
Vernetzte Ressortforschung als Beitrag für Entscheidungen – Das Beispiel Anpassung an den Klimawandel

Hans Moser
Bundesanstalt für Gewässerkunde
moser@bafg.de

Beiträge des Forschungsprogramms KLIWAS zur Klimafolgenforschung



- Änderungen NM7Q im hydrologischen Sommer 2021-2050 gegenüber 1961-1990 (1971-1990 für CCLM4.8)



Niedrigwasser: "nahe" Zukunft:
Sommer +/- 10%
Winter 0 bis +15%

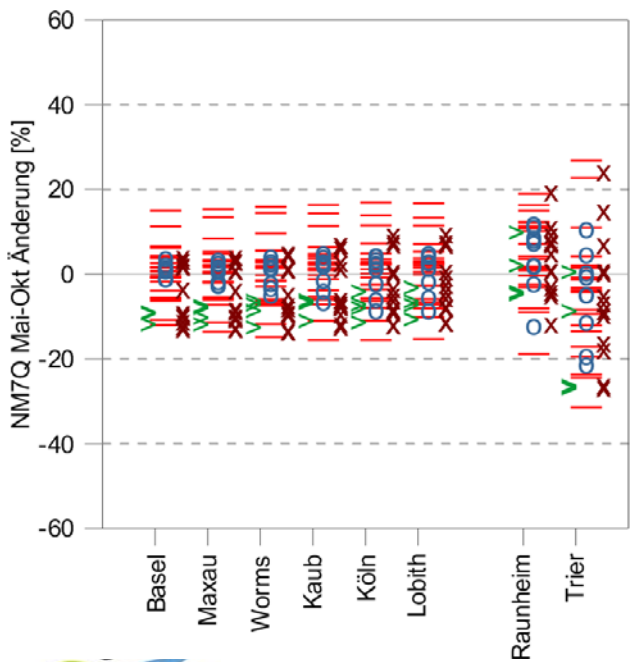
Klimamodellketten wie in

- Rheinblick2050: 22 x
- KLIWA: 4 x
- KLIWAS: 13 x
- CCHydro: 9 x

Begriffsklärung

- **A scenario:** ... is selected.
- ... is a coherent, internally consistent and plausible description of [...] how the future can unfold.
- ... a **projection** may serve as the raw material for a scenario, but scenarios often require additional information.
- **A projection:** ... is model output.
- ... is a model simulation of future conditions which is based on the assumption of a **scenario**.
- **A prediction:** ... can be expressed with a level of confidence.
- ... is often obtained using one or many deterministic models. Usually covers relatively short timescales

- Änderungen NM7Q im hydrologischen Sommer 2021-2050 gegenüber 1961-1990 (1971-1990 für CCLM4.8)



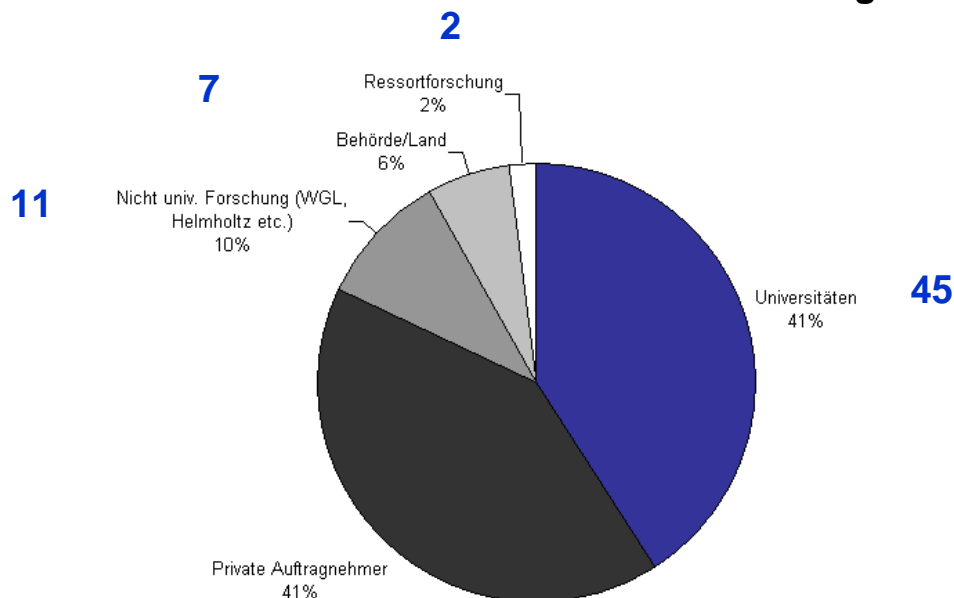
**Niedrigwasser: "nahe" Zukunft:
Sommer +/- 10%
Winter 0 bis +15%**

Klimamodellketten wie in

- **Rheinblick2050: 22 x**
- **KLIWA: 4 x**
- **KLIWAS: 13 x**
- **CCHydro: 9 x**

KLIWAS

im Netzwerk der Wissenschaft und Ressortforschung

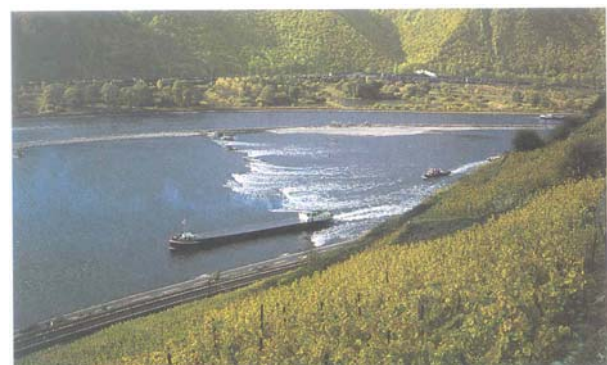
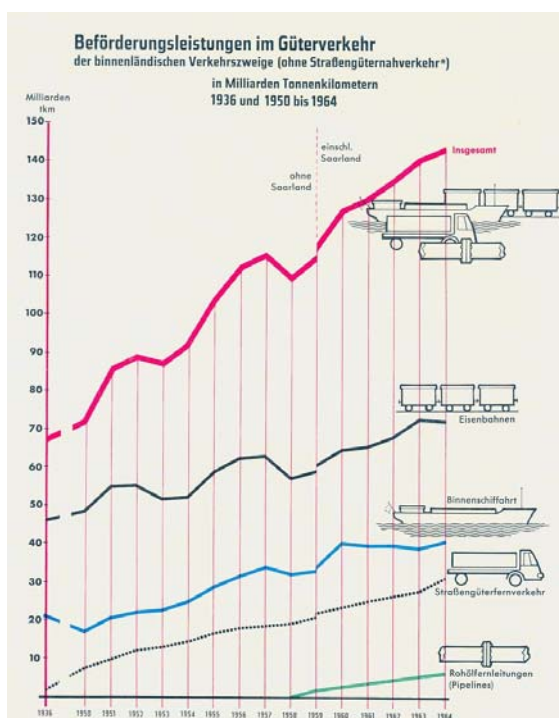


110 Kooperationen/Aufträge
100 Kooperationspartner

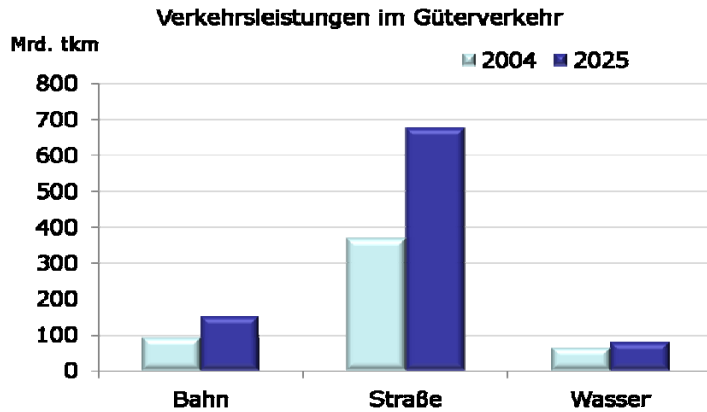
- **Verlässliche Kenntnis des Regelungsgegenstands**
- **Vollständige Vorstellung über die Regelungsoptionen**

- **Grundlagen:**
 - **Wissenschaftliche Arbeit der Ressortforschung**
 - **Zuverlässigkeit und Nutzbarkeit der Ergebnisse durch Wissen zweiter Ordnung**

Güterverkehr 1950 bis 1964



Quelle: Die Verkehrspolitik in der Bundesrepublik Deutschland 1949 – 1965, Schriftenreihe des Bundesministers für Verkehr, Band 29



Quelle: BMVBS 2007, Prognose der deutschlandweiten Verkehrsverflechtungen 2025



Fachöffentlichkeit

+ Wissenschaft

- Görgen et al. 2009
- KHR:
Internationale Wissenschaftliche Kommission mit Mandat
- Grundlage für politische Szenarienbildung
- ZKR übernimmt Inhalte 2010



International Commission for the Hydrology of the Rhine Basin

Assessment of Climate Change Impacts on Discharge in the Rhine River Basin: Results of the RheinBlick2050 Project

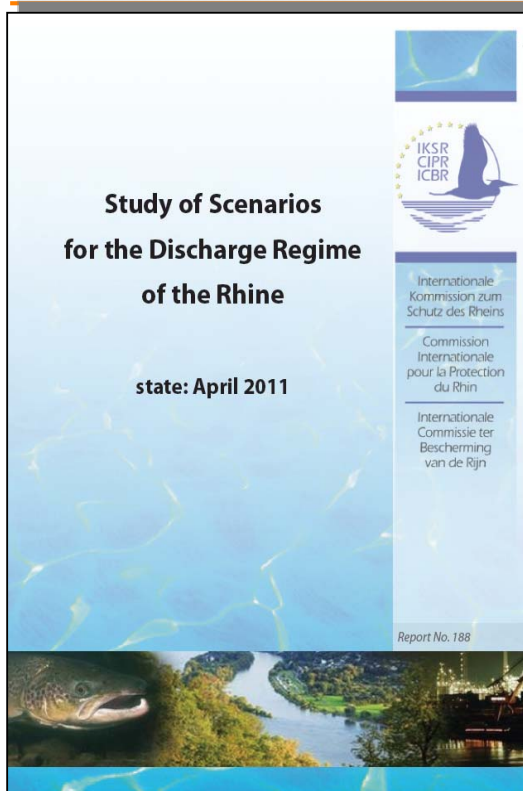
Klaus Görgen, Centre de Recherche Public - Gabriel Lippmann, Luxembourg
 Jules Beersma, Koninklijk Nederlands Meteorologisch Instituut, The Netherlands
 Gerhard Brahmner, Hessisches Landesamt für Umwelt und Geologie, Germany
 Hendrik Buiteveld, Rijkswaterstaat, The Netherlands
 Maria Carambia, Bundesanstalt für Gewässerkunde, Germany
 Otto de Keizer, Deltares, The Netherlands
 Peter Krahe, Bundesanstalt für Gewässerkunde, Germany
 Enno Nilson, Bundesanstalt für Gewässerkunde, Germany
 Rita Lammensen, Rijkswaterstaat, The Netherlands
 Charles Perrin, Cemagref, France
 David Volken, Bundesamt für Umwelt BAFU, Switzerland

Authors are in alphabetical order with the project coordinator and report editor first. See also the RheinBlick2050 Project Group page for further contributors and members.



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 ISBN 978-90-70980-35-1

Szenarienbildung / international



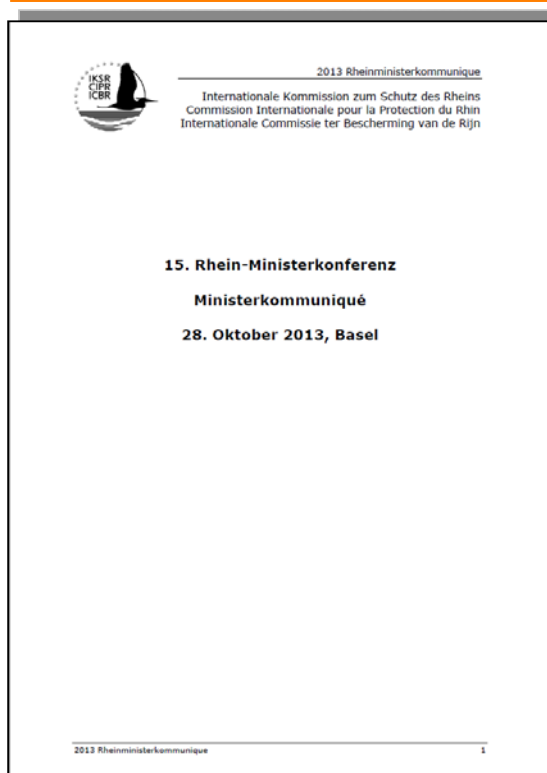
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Dr. Kai Gerlinger	HYDRON GmbH, Deutschland (<i>Author of the literature study</i>)

Grundlagen für Anpassungsstrategien

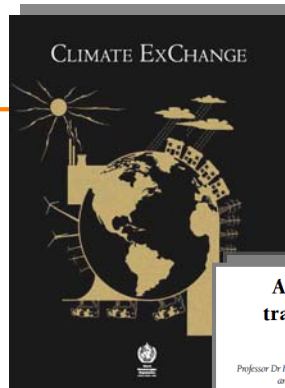


„Die Ministerinnen, Minister sowie der Vertreter der Europäischen Union [...] beauftragen die IKSR bis 2014 eine vorläufige IKSR-Klimaanpassungsstrategie für das Rheineinzugsgebiet auf der Grundlage der Auswertung vorliegender Studien/der Diagnose zum Abflusshaushalt (Hoch- und Niedrigwasser) und zum Temperaturhaushalt zu erstellen.“ (Nr. 41, S. 11)

Beiträge für VN

WMO

➤ Global Framework for Climate Services (GFCS)



An integrated climate service for the transboundary river basin and coastal management of Germany

Professor Dr H Mose, Dr J Cullman, Dr S Köfalk, Dr S Mai and Dr E Nilson, Federal Institute of Hydrology, Germany, and S Römer, Dr P Becker, Dr A Gratzki and K-J Schreiber, German Meteorological Service

All infrastructure planning in water resources management, waterways engineering, flood protection, and coastal defence requires knowledge of meteorological, hydrological and oceanographic parameters on a climate-scale. Since the planning horizon of such infrastructure projects spans from decades to a century and beyond, information about historical and future climate changes is of utmost relevance.

The KLIWAS programme (KLIWAS – Impacts of climate change on waterways and navigation: Searching for options of adaptation) provides an integrated climate information service for the management of transboundary river basins and coastal regions in Germany. It was initiated as a contribution to the German Strategy for Adaptation to Climate Change¹. The KLIWAS initiative provides climatological data and assesses climate impacts for the following sectors: water regime, water resources management, coastal and marine protection, biological diversity, fishery, and transport infrastructure. KLIWAS serves as a knowledge

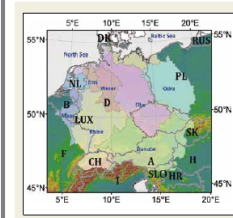
base for stakeholders, like the Federal Waterways and Shipping Administration, and for all others concerned with one of these sectors. The activities are coordinated by the German Federal Institute of Hydrology (IfU) on behalf of the German Ministry of Transport, Building and Urban Development and are closely linked to services provided by the German Meteorological Service (DWD).

Identifying user needs and expectations in the water sector

The outcome of the departmental climate-related hydrological and oceanographical service is driven by stakeholders involved in the management of river basins and coastal regions. To identify the stakeholders, water authorities from inside and outside Germany are informed, for example through the direct involvement of KLIWAS in international river commissions or through organization of regular meetings with politicians, water managers and waterway users (such as KLIWAS status conferences and KLIWAS stakeholder workshops).

We benefited from experiences and the common understanding built by the implementation of the European Water Framework Directive (EU-WFD). The EU-WFD summarizes much of the European experience on pollution control, water quality and ecosystem management, and it represents a comprehensive way to ensure that there is enough clean water for different uses, and to avoid disasters like flooding and droughts. Besides there are traditional responsibilities and roles within water management in a state of a federal structure like Germany with its decision and participation processes of which we take advantage to set up our climate services.

Stakeholders (including the European Commission, the German Federal Ministry of Transport, Building and Urban Development, several other ministries of the Federal German Government and the federal states and their executive agencies, representatives from shipping, ports and industry consulting engineers, water management, environmental protection, nature conservation, and academia, primarily from the field of climate change impact research) are in contact with the KLIWAS consortium to fulfil their needs for climate change related

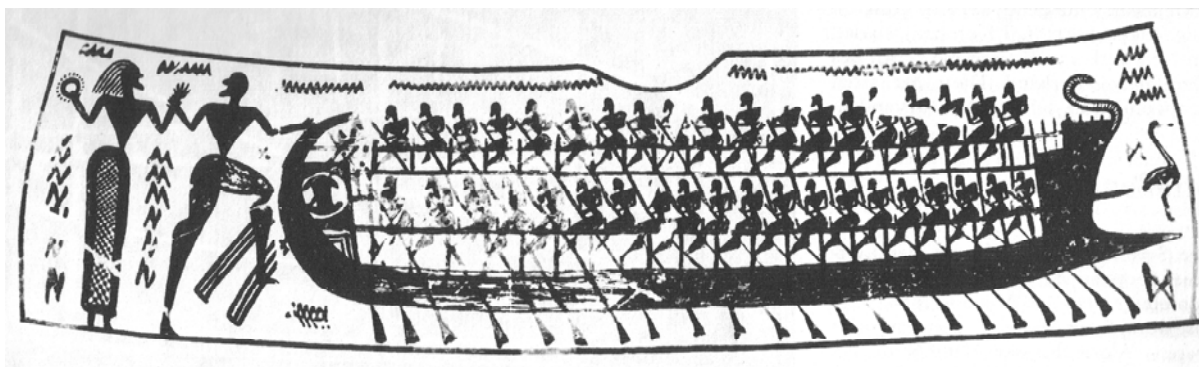


The focus areas of KLIWAS are the basins of the rivers Rhine, Danube and Elbe and the coastal areas of the North Sea

- Acclimatise
- Asia-Pacific Economic Cooperation Climate Center
- Australian Bureau of Meteorology
- Australian Centre for International Agricultural Research (ACIAR)
- Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO)
- Bogor Agricultural University
- Caribbean Institute for Meteorology and Hydrology
- Center for Global Environmental Research, National Institute for Environmental Studies
- China Meteorological Administration
- Climate Works Australia (Monash University)
- Deutscher Wetterdienst
- Dirección Meteorológica de Chile
- Dirección Nacional de Meteorología – Uruguay
- European Space Agency
- EDF Research and Development
- Food and Agriculture Organization (FAO)
- Finnish Meteorological Institute
- German Federal Institute of Hydrology
- Hong Kong Observatory
- India Meteorological Department
- Indian Space Research Organization
- Indonesia Agency for Meteorology, Climatology and Geophysics (BMKG)

- Institute of Atmospheric Physics (IAP), Chinese Academy of Sciences (CAS)
- International Commission for the Protection of the Danube River
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
- International Union of Railways (UIC)
- James Cook University
- Japan Meteorological Agency (JMA)
- Kenya Meteorological Department
- Korea Meteorological Administration
- Meisei Electric Co Ltd
- Météo-France
- National Institute of Water and Atmospheric Research, New Zealand
- National Oceanic and Atmospheric Administration (NOAA)
- Pacific Disaster Center
- Qatar Meteorological Department
- Remote Sensing Technology Center of Japan (RESTEC)
- Republic Hydrometeorological Service of Serbia
- Swedish Meteorological and Hydrological Institute
- University of Southern Queensland
- UK Met Office
- Weathernews

Was ist eigentlich ein Problem ?



Quelle: Karl Schefold, Frühgriechische Sagenbilder, Hirmer Verlag München 1964

Was ist eigentlich ein Problem ?



Dorthin möcht' ich, wo waldiger Küstenvorsprung,
Von Wogen umspült, sich hebt,
unter Sunions hohen Fels,
heilige Stadt Athen,
Dich von ferne zu grüßen!

γενοίμαν, ἐν' ὑλᾶεν ἔπεστι πόντου
} πρόβλημα' ἀλίκλυστον, ἄ-
} κραν ὑπὸ πλάκα Σουνίου,
} τὰς ἱεράς ὅπως
προσείποιμεν Ἀθῆνας.

Quelle: Sophokles Werke, „Rasender Ajas“, Verlag Wilhelm Engelmann Leipzig 1851

Was ist eigentlich ein Problem ?



O wär ich, wo waldreich überm Meere das
Vorgebirg, [**πρόβλημα'**] das umwogte, ragt
unter Sunions hohem Fels,
daß wir die heil'ge Stadt Athen
wieder begrüßten.

Quelle: Roland Reuß, „Ende der Hypnose“, Stroemfeld Verlag Frankfurt am Main 2012

**Das Ressortforschungsprogramm KLIWAS
ist eine Navigationshilfe, von der wir Position
und Richtung für den Umgang mit
Problemen erwarten dürfen.**