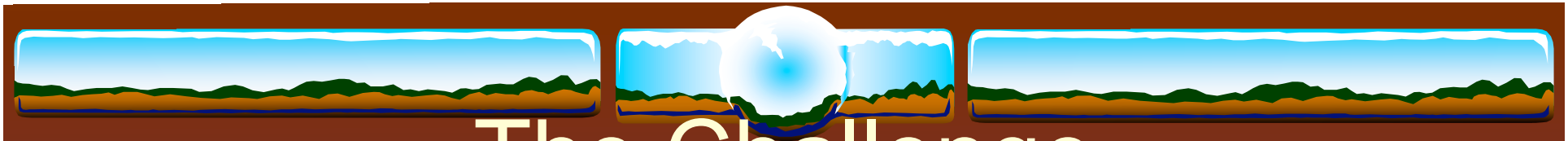
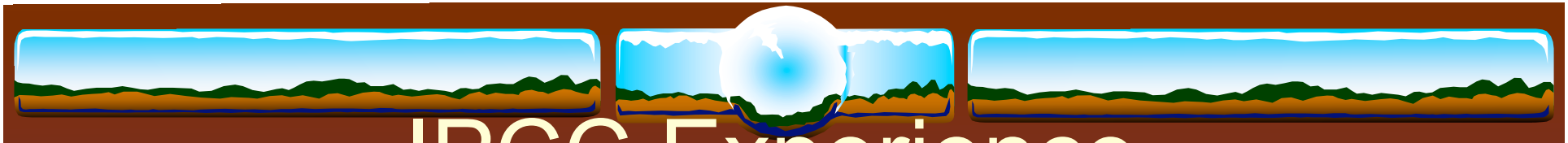


The Challenge

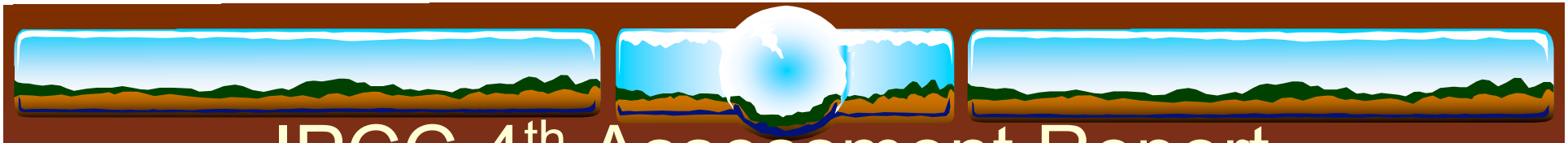
- Properly determining and describing uncertainties is the key to successful science-policy dialogue.

- Within the scientific disciplines scientists have developed satisfactory means of expressing uncertainty in their results.
- However, these conventions are not always understood by those who have to make decisions.
- The IPCC has recognized the importance of developing an approach that communicates uncertainty.
- We must be clear on what exactly uncertainties we are assessing.
- It has to be recognized that in addition the IPCC terms have to be translatable into other UN languages.



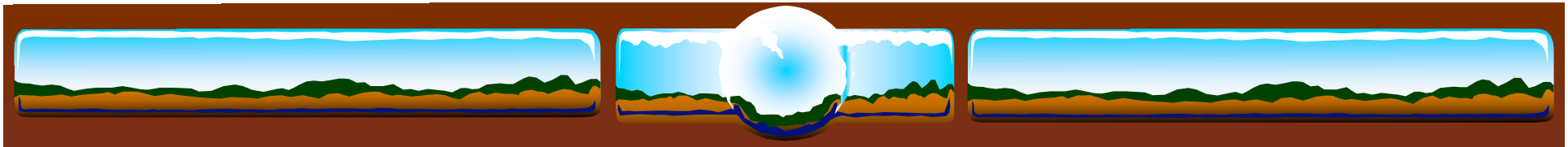
IPCC Experience

- The importance of a consistent approach for discussing uncertainties was formally recognized in the 3rd Assessment, primarily because of the need to be able to integrate information between Working groups.(c.f: Moss, R., and S. Schneider, Uncertainties, in Guidance Papers on the Cross Cutting Issues of the Third Assessment Report of the IPCC, edited by R. Pachauri, T. Taniguchi, and K. Tanaka, Intergovernmental Panel on Climate Change (IPCC), Geneva, 2000.)
- However, it became clear that many of the authors had not thought deeply about such issues as the different constraints in describing uncertainties regarding observations and modelling results.
- All authors were urged to explain carefully the steps taken in determining uncertainties.
- Despite all good efforts many chapter writing teams, especially in WGIII, left any systematic consideration of uncertainties until the end of the process and there was a lack of consistency between WG's.
- It was not clear that the IPCC had been any better at describing uncertainties to policy-makers.



IPCC 4th Assessment Report

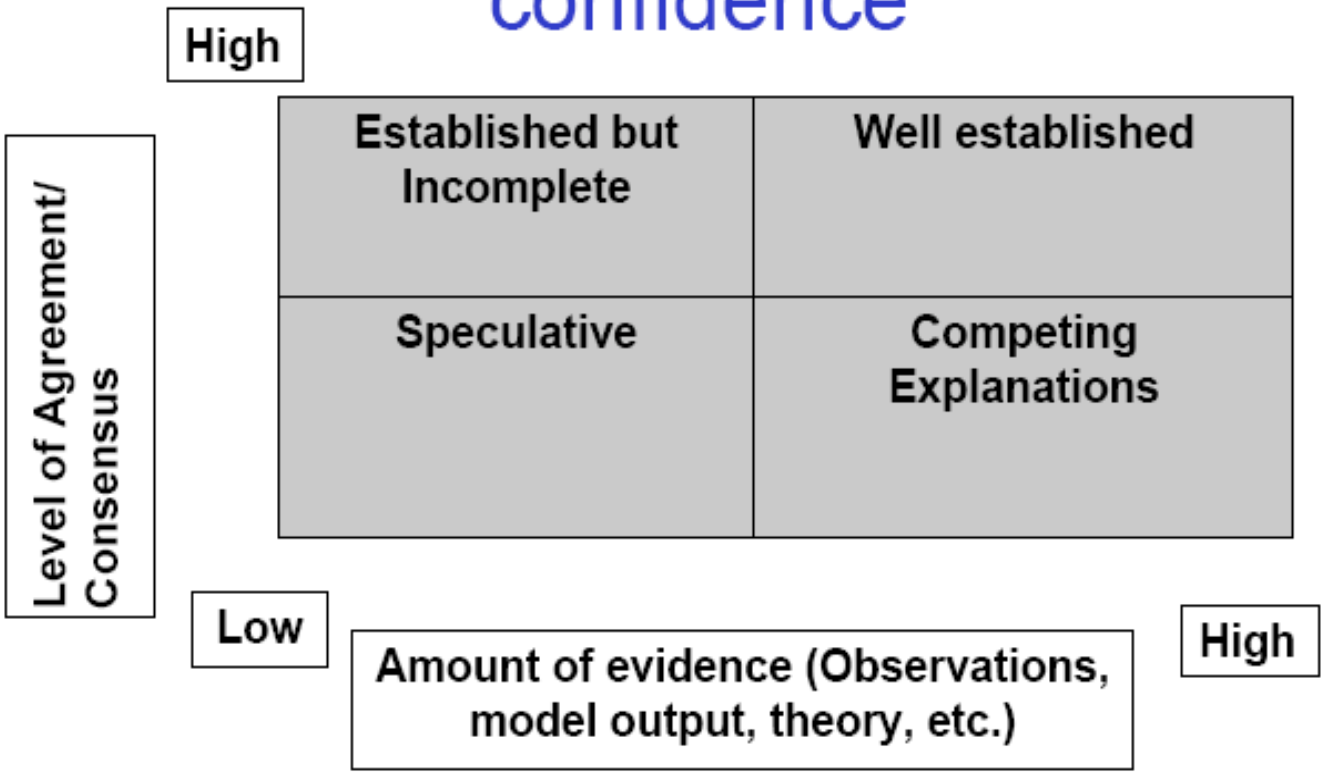
- A fresh attempt to handle uncertainties (as well as the allied topic of risk assessment) is being followed in writing the 4th IPCC Assessment.
- We need terms for describing quantitatively and, where this is not possible, qualitatively the level of confidence in a conclusion:
  - This is often a collective scientific judgment;
  - It involves an assessment of the amount of evidence available and the degree of scientific consensus regarding the explanation;
  - In quantitative terms it can indicate the reproducibility of the result;
  - Confidence levels will have fuzzy boundaries (see ACIA).
- We also need terms for describing the likelihood of a climate change projection.
- The writing of a Guidance Paper is being lead by Manning and Petit.
- Agreement has been reached between authors in WGI and II.

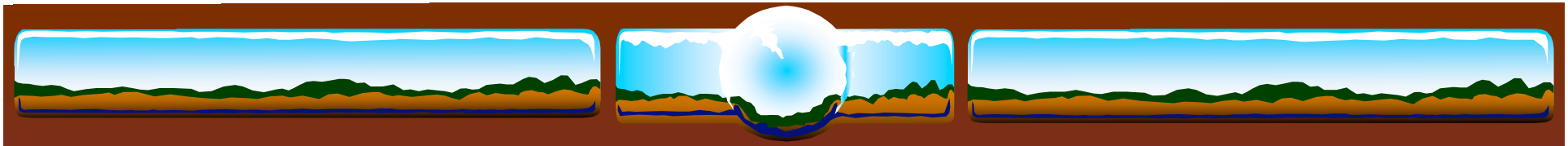


Sources of Uncertainty

- Incomplete or imperfect observations.
- Incomplete conceptual frameworks.
- Poor prescriptions of known processes.
- Chaos.
- Lack of predictability (especially in socio-economic systems).

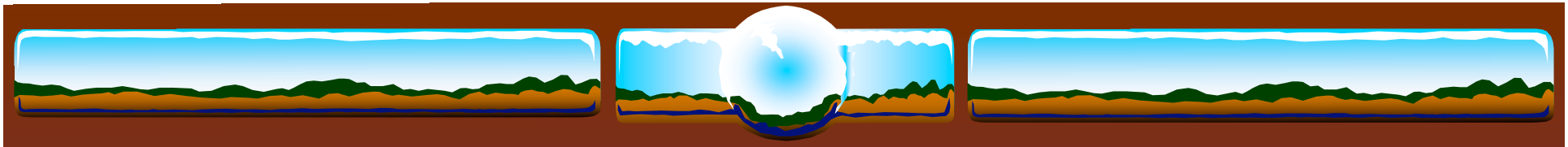
Qualitatively defined levels of confidence





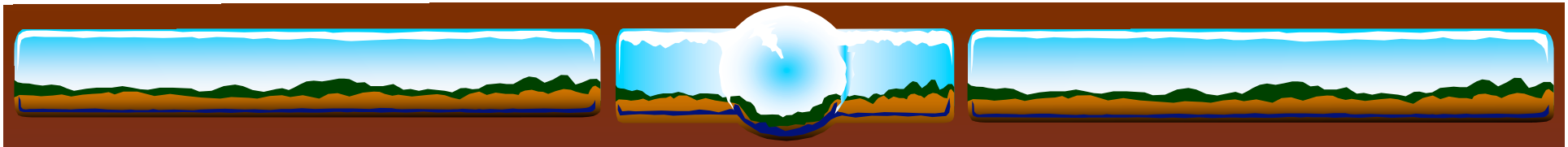
Reaching Agreement

Category	Distributed Guidance Note	WG2 proposal (TAR)	Addis Ababa proposal
Low-agreement-little-evidence	*Exploratory*	*Speculative*	*At an early phase of research*
Low-agreement-much-evidence	*No agreed explanations*	*Competing explanations*	*Differing or no explanations*
High-agreement-little-evidence	*Agreed but not fully established*	*Established but incomplete*	*Established but incomplete evidence*
High-agreement-much-evidence	*Well established*	*Well established*	*Well established*



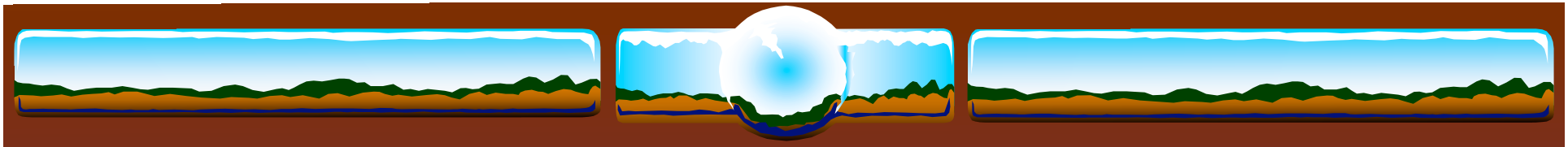
Quantitative Levels of Confidence

Very high confidence	**At least 9 out of 10 chance of being correct**
High confidence	**About 8 out of 10 chance**
Medium confidence	**About 5 out of 10 chance**
Low confidence	**About 2 out of 10 chance**
Very low confidence	**Less than 1 out of 10 chance**



Quantitative Statements of Likelihood

Virtually certain:	**>99% probability of occurrence**
Very likely:	**90 – 99% probability**
Likely:	**66 – 90% probability**
About as likely as not	**33 – 66% probability**
Unlikely:	**10 – 33% probability**
Very unlikely:	**1 – 10% probability**
Exceptionally unlikely:	**<1% probability**



Application to Extremes

- Availability of sufficient data particularly on short duration extremes such as heavy rainfall
- Difficult to distinguish from natural variability.
- Need for special statistical techniques.
- Limitations of climate models to make projections on the small scale of many extremes.
- Importance of low probability but high impact events.
- High level of confidence but low likelihood.
- Possible use of probability distribution functions.