

- Raw computing power needed
 - You need a supercomputer – what kind?
 - What kind of interfaces you show?
 - Linked with manpower
 - What you want to compute 10 years from now?
- Emerging links between disciplines
 - Astronomy and atmospheric research
 - Env. Modelling and agriculture, health
 - Saline tolerant crops, invasive species, increased infection risks
- Actionable knowledge issues
 - Who is going to jail?
 - „is this really a trend?“
- Multi-scale issues
 - E.g. global-to-urban climate model, tsunami cases
 - „Bottom up“ phenomena: aerosols on climate, plankton on typhoons

- Communications
 - „Why can't you just...?“ (downscale existing models,
 - Cost of doing simulations – fitting the mid map of funding agencies
- Potential showcases/flagships
 - E.g. Taiwan Earth System Model
 - Role of Phytoplankton in typhoon formation
 - Pseudo global warming case (“no mitigation approach can cope”)
 - “What would happen if we restored palm forests?”
 - DMCC
 - Traffic analysis
 - Flooding in Mekong delta
- Problem focused approach
- Vocabulary
 - Ontologies (“gravity” issue)
 - Partnerships
- Urbanisation, Climate and canopy effect mentioned often

- Limitations mentioned often – common framework?
 - Computing capacity related (computing, memory, storage, network,...)
 - Other technical issues (measurement accuracy, coverage)
 - Access issues (cost of computing and data sets)
 - Sustainability (funding, retaining skills)
 - Process issues (version mgt practices)
 - Policy issues (mandates of organisations, AUPs)
 - Manpower (available amount, skillsets)

- What is Environmental Computing?
 - Use models as a tool to explore complex phenomena, disaster mitigation
 - Two sides: #1 science to provide hypothesis, #2 disaster mitigation to save lives (even with incomplete data)
 - Model natural resources
 - Communication approach
 - Next level of understanding
 - Way to apply scientific results in practice?

- Using (major) IT infrastructures, best practices
 - “I don’t use them, I train others”
 - Own cluster, close collaboration with computing centre
 - Resolving the equipment/services budget issue open issue
 - One approach: federating dedicated equipment
 - Scalability limits can appear early with current model software
 - Individual CPUs are not noticeably getting faster
 - Urgent computing is of definite interest
- Cloud in limited use, attractive vision
 - Put all data in the cloud?
 - Open data easier starting point than computing?
 - Cost?
- Open data interesting, brings up issues
 - Governance, regulations,...
 - Limits the scope of possible research activities

- Data issues
 - Openness inversely proportional to political sensitivity
 - Face to face meetings needed
- Training and education
 - “Urgent programming approach” shows promise – in Asia
 - Awareness of the available services
 - Professors approach and practices an important factor
 - Partnership between model developers and IT resource managers important
- Research to production?
 - Consulting model a pathway to commercial use
 - Public sector funding is still largely project-based, sustainability difficult even for mature components
 - Gap between ministries
 - Lack of understanding of the power of simulation

- Link to the practitioners (government,...) best practices
 - Personal contact, message tuned to the audience
 - Media is important
 - Researcher to researcher communication often easy, government less so

■ Thank you!!

- Morning presentations already at www.envcomp.eu
- This will follow soon
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