National Climate Predictions and Projections Platform (NCPP)

Exploring roles that NCPP might play in providing local climate projection information to the engineering community

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NCPP Core Organizing Team
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Exercise

- Imagine you are involved in an activity or project where you choose (or are mandated) to consider the impacts of climate change. Or think back to one that you have been involved in….

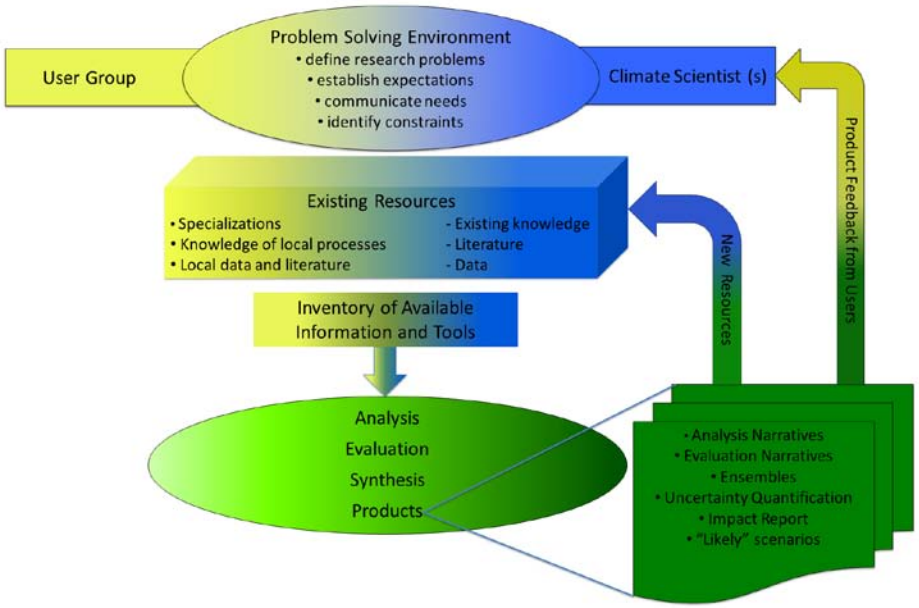
- What major difficulties or BARRIERS do you face in using climate projection data on scales appropriate for the project? Write three of these down, on separate ORANGE notecards.

- Suppose you are presented with some downscaled climate projection data. How do you determine the CREDIBILITY this data for use an engineering application? Think of three things that would like to know about the data that would help you to judge its credibility. These go on the GREEN cards.

Mission and Strategy

Mission: Supports state-of-the-art approaches to develop and deliver comprehensive regional climate information and facilitate its use in decision making and adaptation planning.

Strategy: A community enterprise where climate information users, infrastructure developers, and scientists come together in a collaborative problem solving environment.



Core Organizing Team

- Ammann, Caspar
- Anderson, Donald
- Barsugli, Joseph
- Buja, Lawrence
- DeLuca, Cecelia
- Guentchev, Galina
- Herring, David
- Higgins, R. Wayne
- Ray, Andrea
- Rood, Richard
- Treshansky, Allyn

Interim Climate Science Applications Team

- **Current Membership:** K. Dixon (GFDL), K. Hayhoe (Texas Tech), R. Horton (Columbia Univ.), K. Kunkel (NCDC; NC State), X.-Z. Liang (Maryland), L. Mearns (NCAR), J. Winkler (MSU), A. Wood (NWS/CBRFC)
- **Current Focus:** Provide scientific foundation for 2013 workshop on "Evaluation of Downscaling Techniques"
- **Future:** Evolve CSAT as an advisory and decision-making component of NCPP that oversees broad-based NCPP applications

NCPP is an emergent community

- Focused on the synthesis of existing climate capabilities spread across federal agencies, regional and local governments, universities, **professional societies**, nonprofits, and commercial activities

- Community participation in development of capabilities and problem solving
  - Evolving governance structure → based on open-source, open-innovation principles

What is different in the past decade?

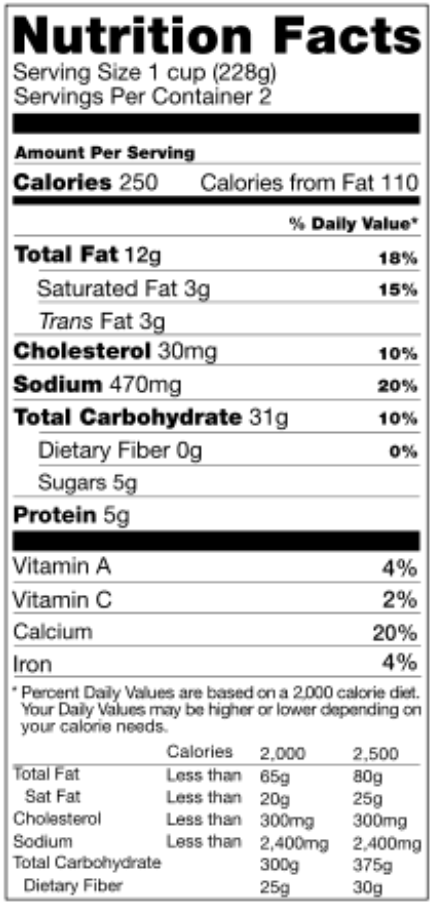
- Emergence of open-source, open innovation communities for software development and complex problem solving.
- Evolution of governance practices and management approaches that lead to functioning, sustainable organizations.
- Development and deployment of tools to build and support communities.
- Structured, co-developed problem solving with multiple constituencies

Evaluation of Local and Regional Scale Projections

- Statistical and dynamical downscaling
- Three “Protocols”
  - Comparison to observations using standardized test suite
  - “Perfect model” – tests of nonstationarity in statistical downscaling using multii-resolution global simulations
  - Idealized tests (simple cases or analytical solutions)
- Evaluation Metrics
  - Basic error statistics (RMSE, correlation, …)
  - Statistics on extremes
  - Sector-specific metrics
- Workshop in Summer 2013 with scientists and practitioners
- Learn from and collaborate with EU programs

Metadata : Context

- Develop metadata language
  - Describe downscaling methods
  - Describe quantitative evaluation and metrics
  - Allow qualitative information
- Document “provenance” of the data
  - Traceable chain of analysis
  - Quality information at each step
- Communicate information clearly
  - Ingredients
  - Nutrition Facts



Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

Calories 250	Calories from Fat 110
	% Daily Value*
Total Fat 12g	**18%**
Saturated Fat 3g	**15%**
Trans Fat 3g	
Cholesterol 30mg	**10%**
Sodium 470mg	**20%**
Total Carbohydrate 31g	**10%**
Dietary Fiber 0g	**0%**
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

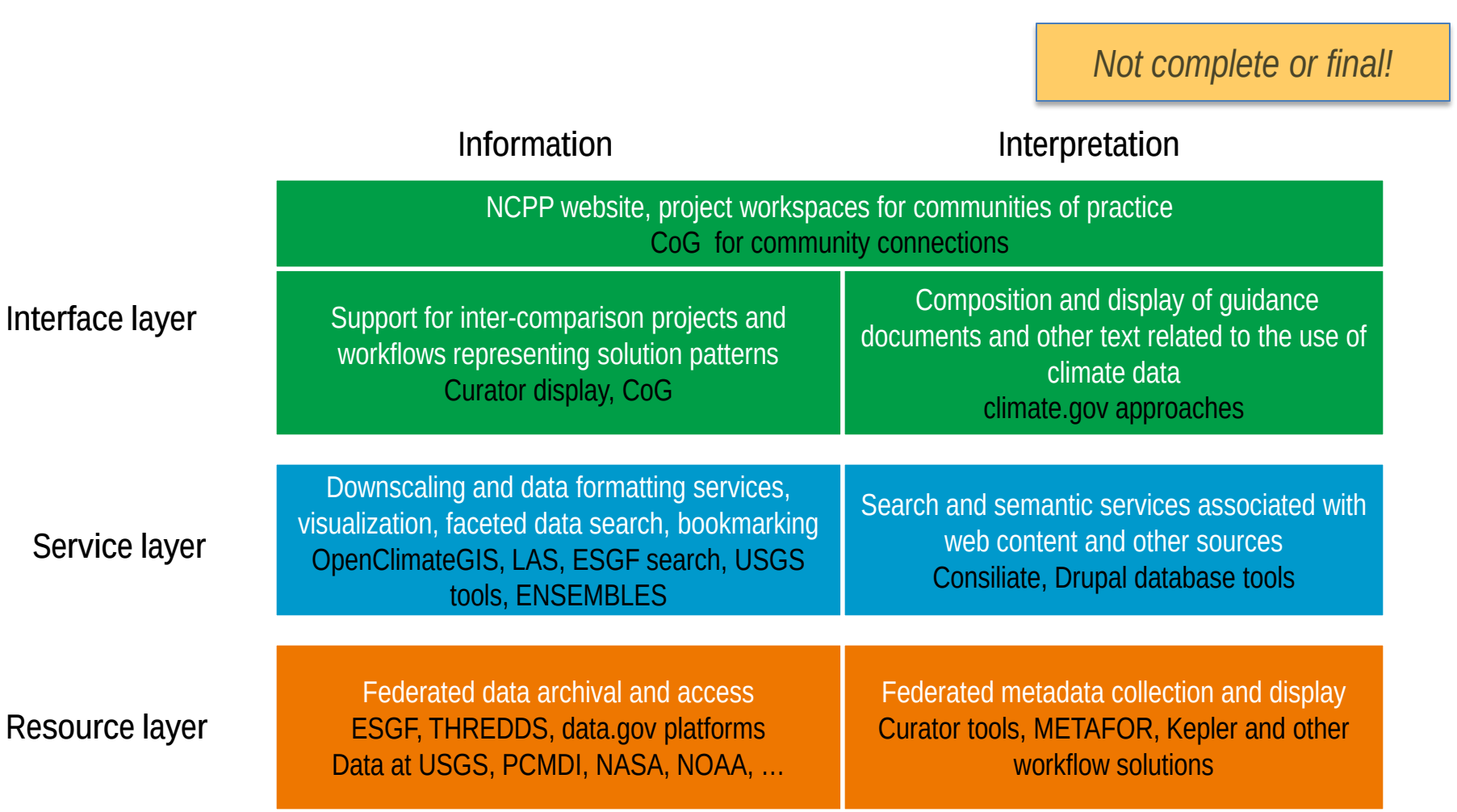
	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Long-Term Goals

- Long-term goals include
  - Provide digital infrastructure to supply downscaled data in user-friendly formats (e.g. GIS) along with rich metadata.
  - Assemble a collection of tools to be employed in climate impacts studies (QC, validation, ensemble analysis, uncertainty description)
  - Provide an environment for collaborative qualitative and quantitative analysis
  - Provide information, expertise, and capability base through community interactions

Draft Architecture
(technologies and services are examples)

Not complete or final!



Some Key Issues to Establish Downscaling Framework

- Guidance regarding practice in selection, combination, and interpretation of multiple GCM and scenario simulations to generate regional projections.
- A basis for selection and interpretation of dynamical and statistical downscaling techniques.
- Characterizing the degree to which new CMIP5/AR5 simulations might change the story of what we expect for specific regions, compared to AR4 generation simulations.
- Establishing a way to standardize across the results of previously published impact literature that is based on a wide variety of GCM / scenario / downscaling approaches, some dating back more than 20 years.

Courtesy Katharine Hayhoe

Summary

- NCPP is focused on the synthesis of existing capabilities to build a sustained capability. Relies on the past decade's:
  - Investments in use of climate information
  - Investments in information technology infrastructure
  - Emergence of successful approaches to govern distributed communities
- Status
  - Identifying and evaluating capabilities
  - Engaging communities and organizations
  - Design, planning, and review of IT architecture and governance
  - Implementation of prototype activities through use cases and pilot projects.