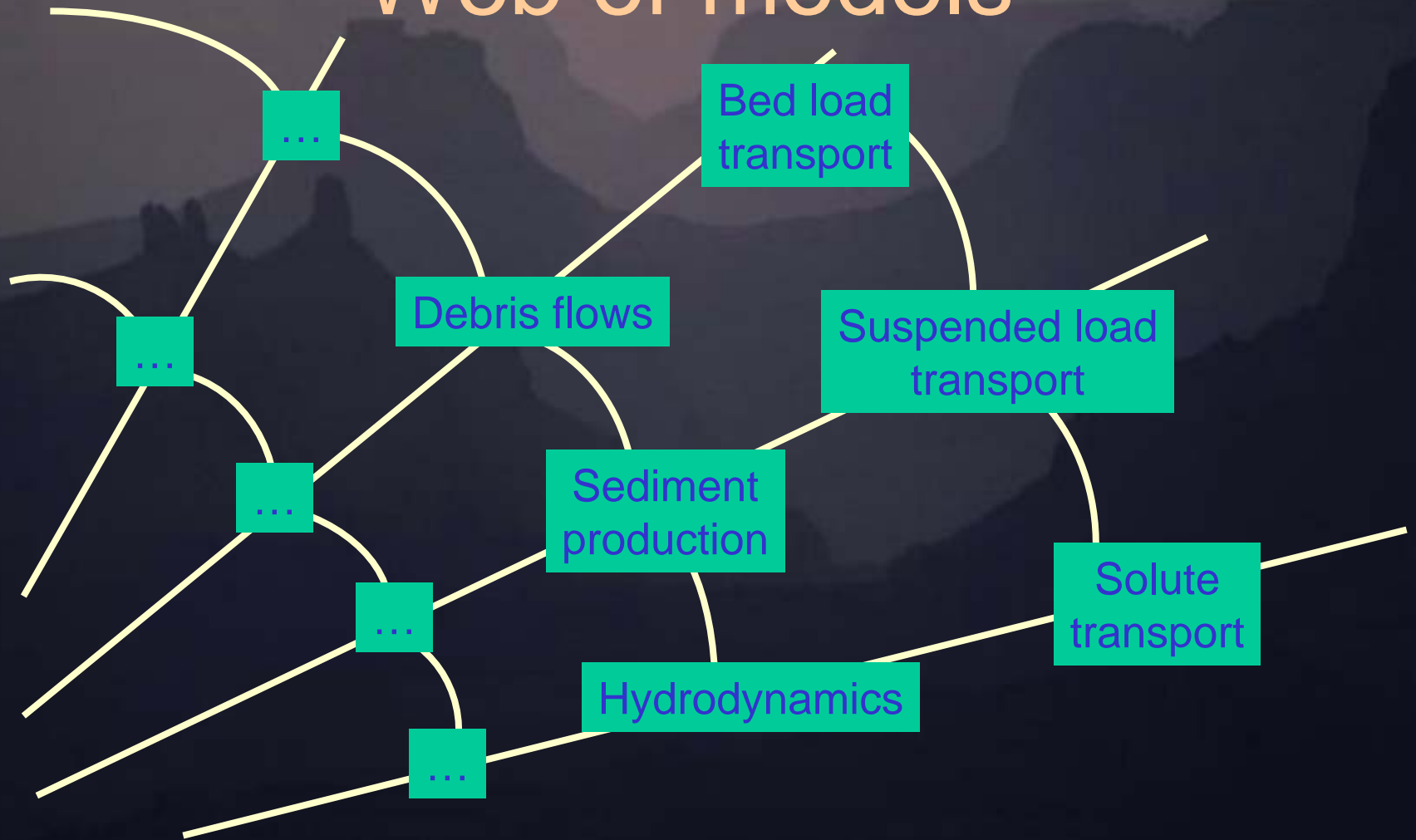


# Nature of a Community Surface Dynamics Modeling System: Capabilities & Requirements

# “Web of models”



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# 1. Inclusivity

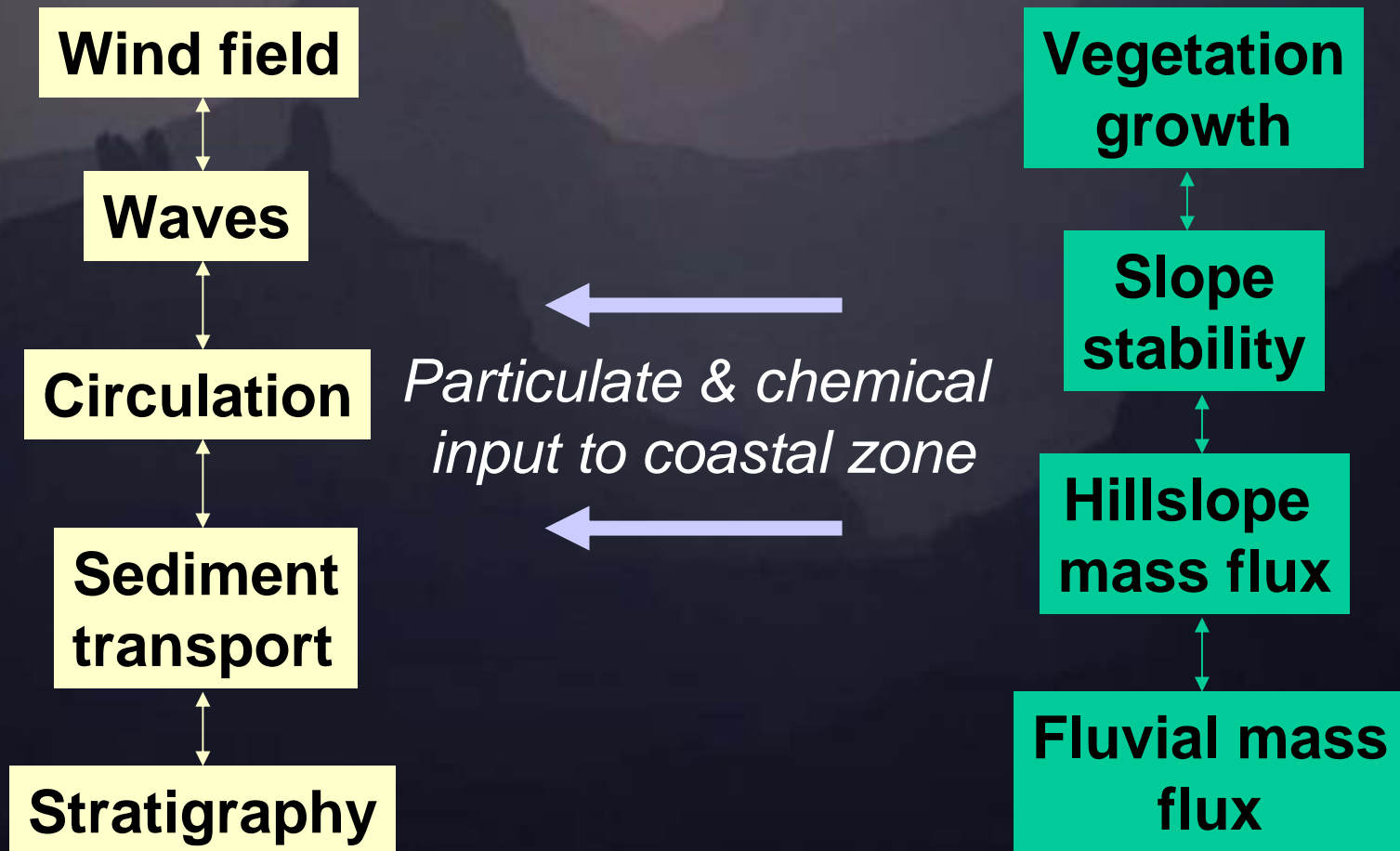
- Physical processes
- Chemical processes
- Biological processes
- Coupling among these



## 2. Modularity

- Input from diverse communities
- Update parts as science evolves
- Multiple working hypotheses
- Linking components

# Modularity: examples



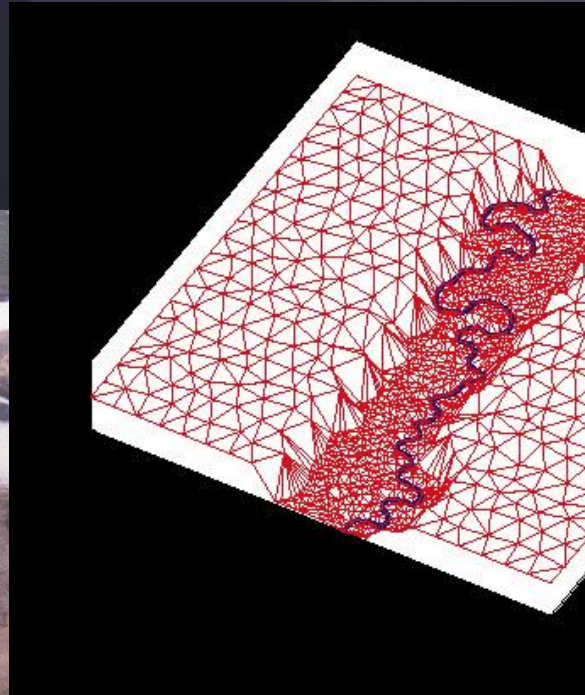


# 3. Cutting Edge

- Latest concepts in geoinformatics
- Designed around key aspects of surface systems:
  - Self-organization
  - Localization
  - Thresholds
  - Coupling
  - Scale invariance
  - Interwoven biology & chemistry

# Key properties of surface systems

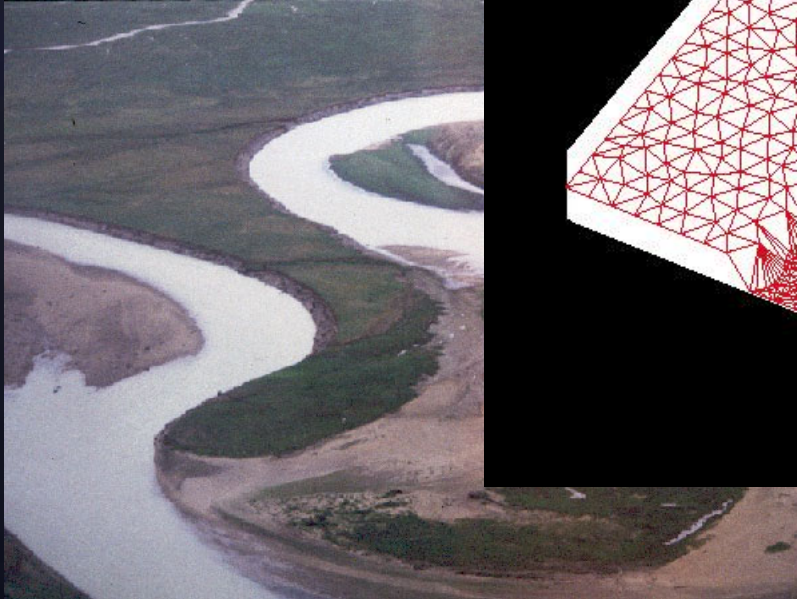
Localization



Thresholds



Self-organization



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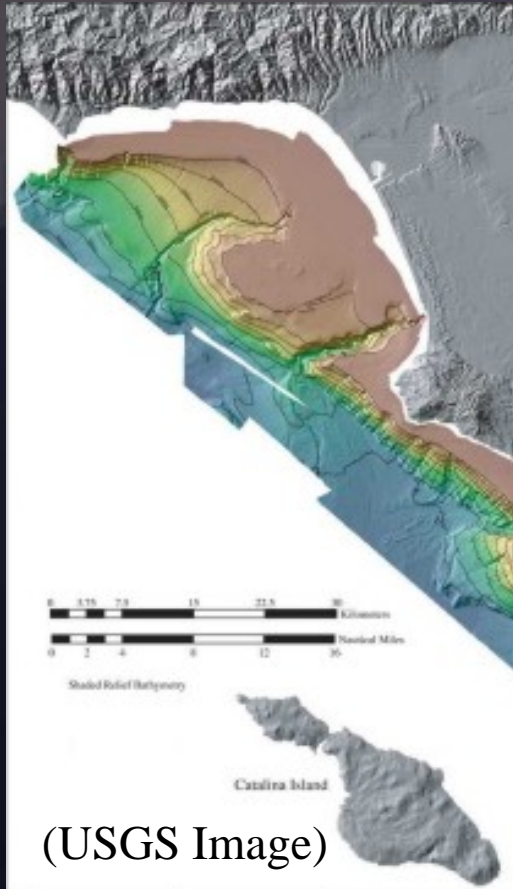


# Key properties of surface systems

Scale invariance

Interwoven biology  
and chemistry

Strong linkage



甘肃靖远山川景观



(USGS Image)

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## 4. Extensibility

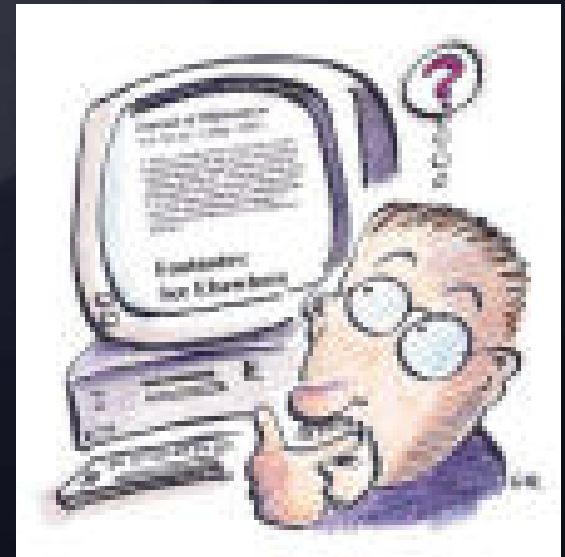
- Easy to update as knowledge improves
- Easy to replace & modify modules
- Easy to add new processes and ideas
- Grows with computing technology improvements

➔ Object-oriented architecture

➔ Ability to add variables & algorithms without altering other building blocks

# 5. User friendly

- Users are:
  - Researchers
  - Resource managers
  - Not all computing savvy



# 6. Living with Uncertainty

- Dynamic chaos
  - Heterogeneity
  - Uncertainty in inputs
- Requires tools to handle uncertainty and stochastic behavior
- Ensemble averaging
  - Stochastic modeling
  - Error analysis



A background image showing a silhouette of a mountain range against a sunset sky. The sky is a gradient of orange and yellow, while the mountains are dark blue and black. The text "On to Pat Wiberg ..." is centered in a white, italicized serif font.

*On to Pat Wiberg ...*

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