Surface exchange, Technical development and Validation

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Overview

- Future plans for surface exchange layout
- Plans for technical development
  - Code structure
  - System structure
- Validation
  - Benchmarking

Surface Exchange

Surface flux calculation

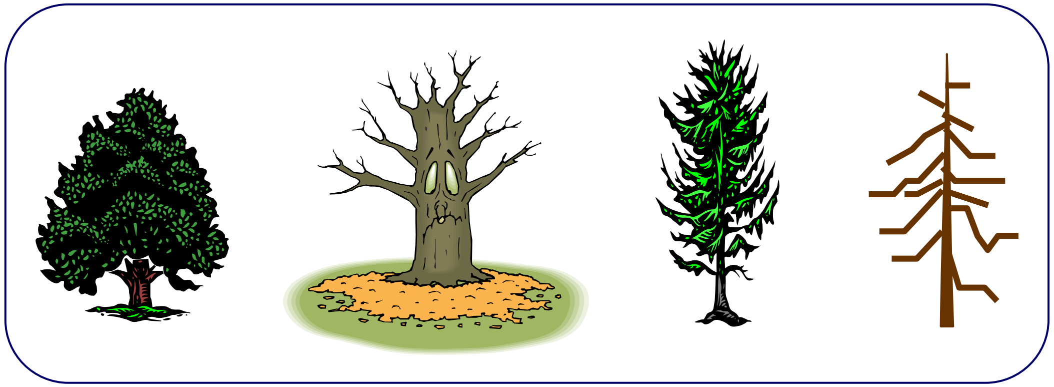
- Currently difficult to understand!!!
- Future structure
  - Fully explicit
    - $H, LE = f_1(T_*, T_1, q_1)$
  - Penman-Monteith
    - $H, LE, T_* = f_2(T_1, q_1)$
  - Fully implicit
    - $H, LE = f_3(T_1 = g_1(H), q_1 = g_2(E))$

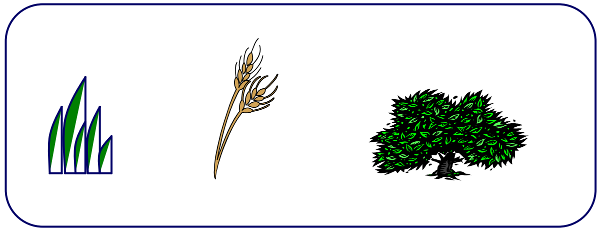
Common routines for all surfaces

- Currently
  - Different routines for land and sea/sea-ice
  - Mixed up within code making it difficult for development and maintenance
- Future
  - Common routines
    - Possibility of additional functionality
  - …….. but in two sections
    - Memory space

Flexible tiles with elevation bands

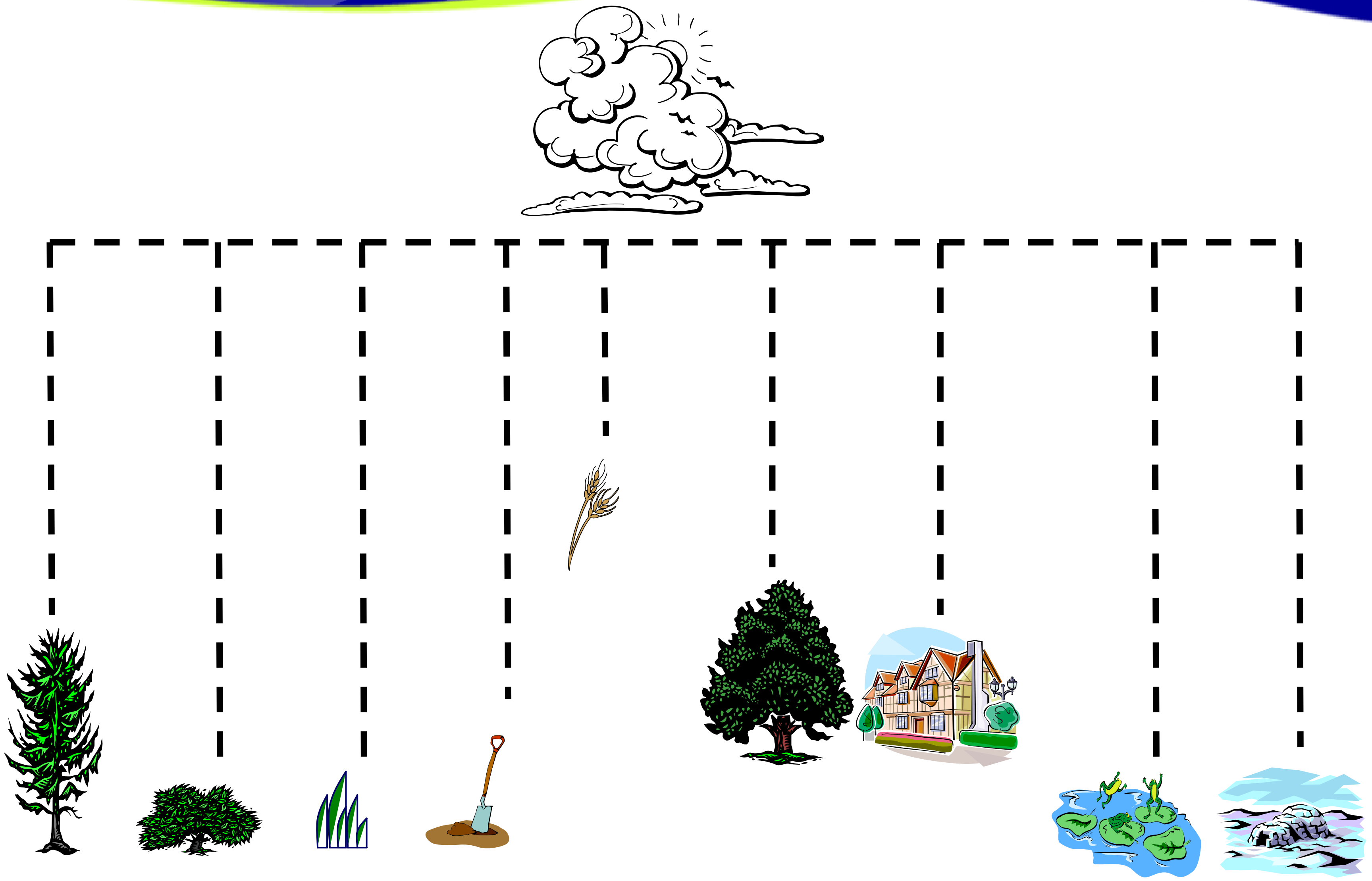
- User to specify number and definition of tiles



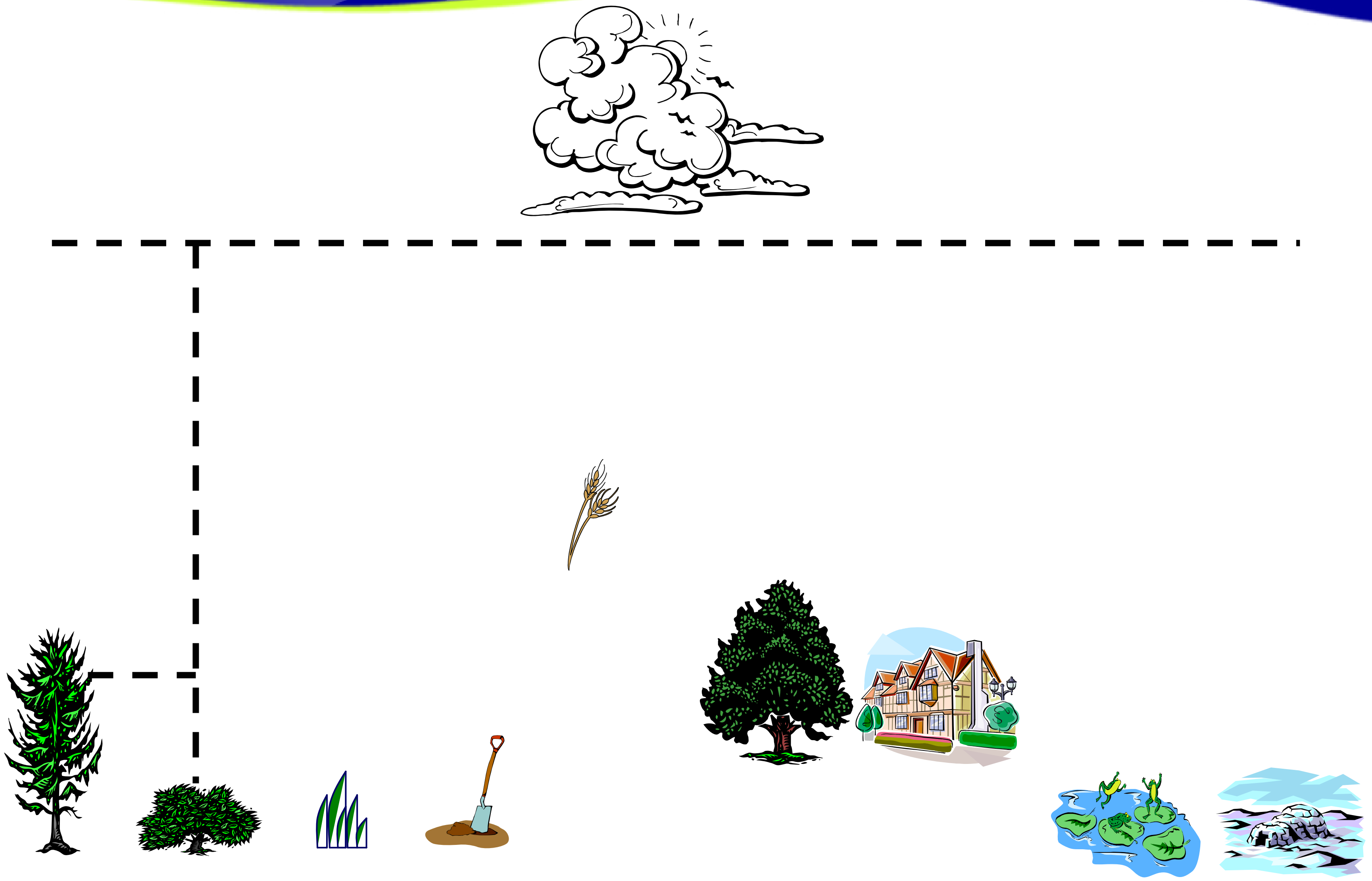


- Elevation associated with tiles

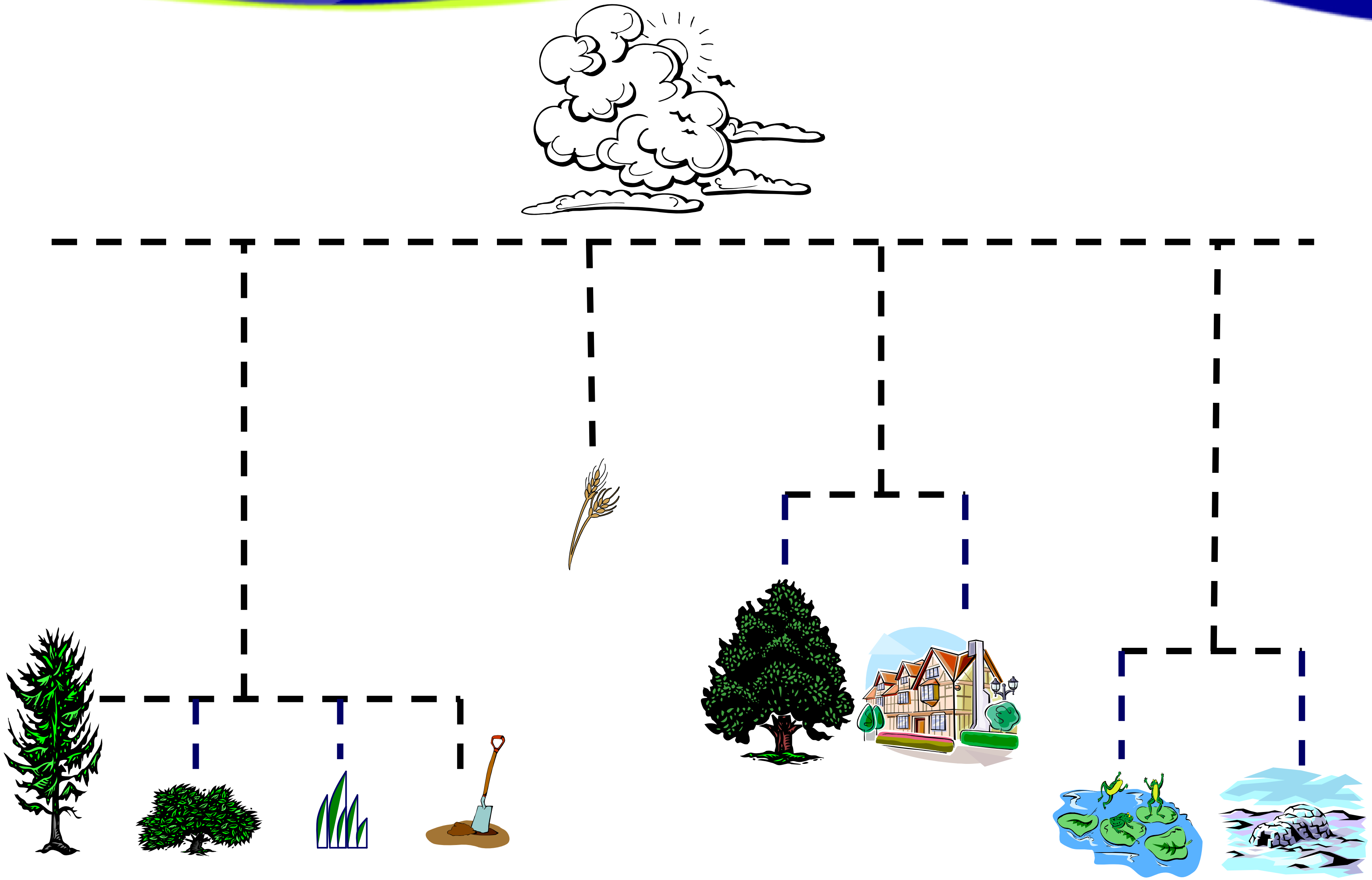
Multiple source tiles scheme



Multiple source tiles scheme

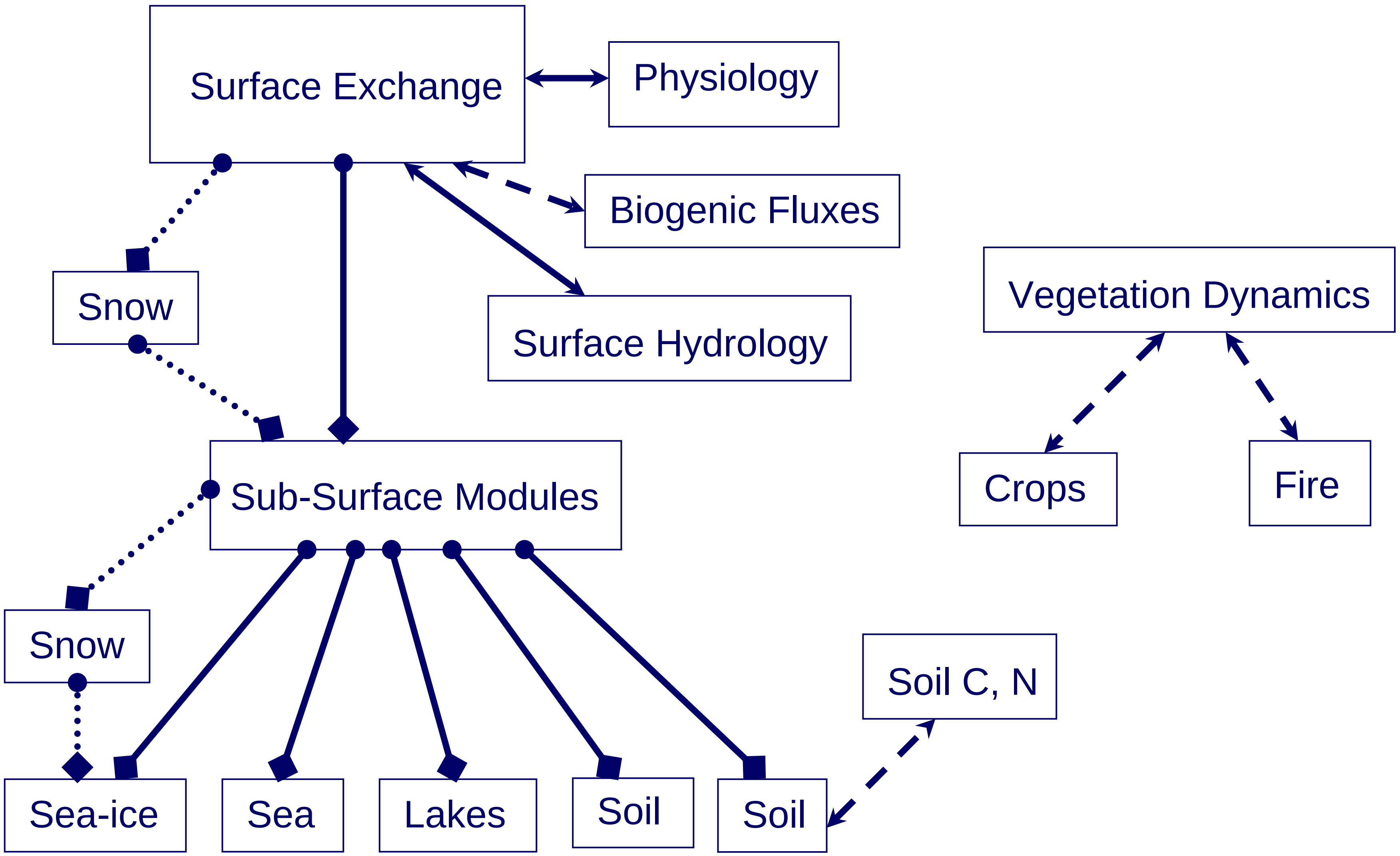


Multiple source tiles scheme



Technical Development

Modular structure



System structure

- JULES code within fcm code management system
  - User changes subroutines
  - Help with code consolidation for new versions
  - Used by user community?
- How many code repositories?
  - Single repository outside of UM
    - Executable module called by UM?
    - Subroutines extracted for UM executable build?
  - + mirrored repository inside UM?

Validation

Benchmarking

- Protocols for new code development
- New functionality introduced by switches
  - Bit comparison for particular model set-ups
- Set of benchmarking data
  - Must achieve acceptable validation against data to be accepted into new version
- What is acceptable?
  - Decisions made by management committee