

Units in SWEET 2.0: sciUnits.owl

Rob Raskin

NASA/ Jet Propulsion Laboratory

<http://sweet.jpl.nasa.gov/2.0>

SWEET 2.0

- Integrated set of 90 modular ontologies
- Serves all aspects of Earth system science and associated data
- 4000 concepts in OWL-DL
- Funded by NASA to assist search for data

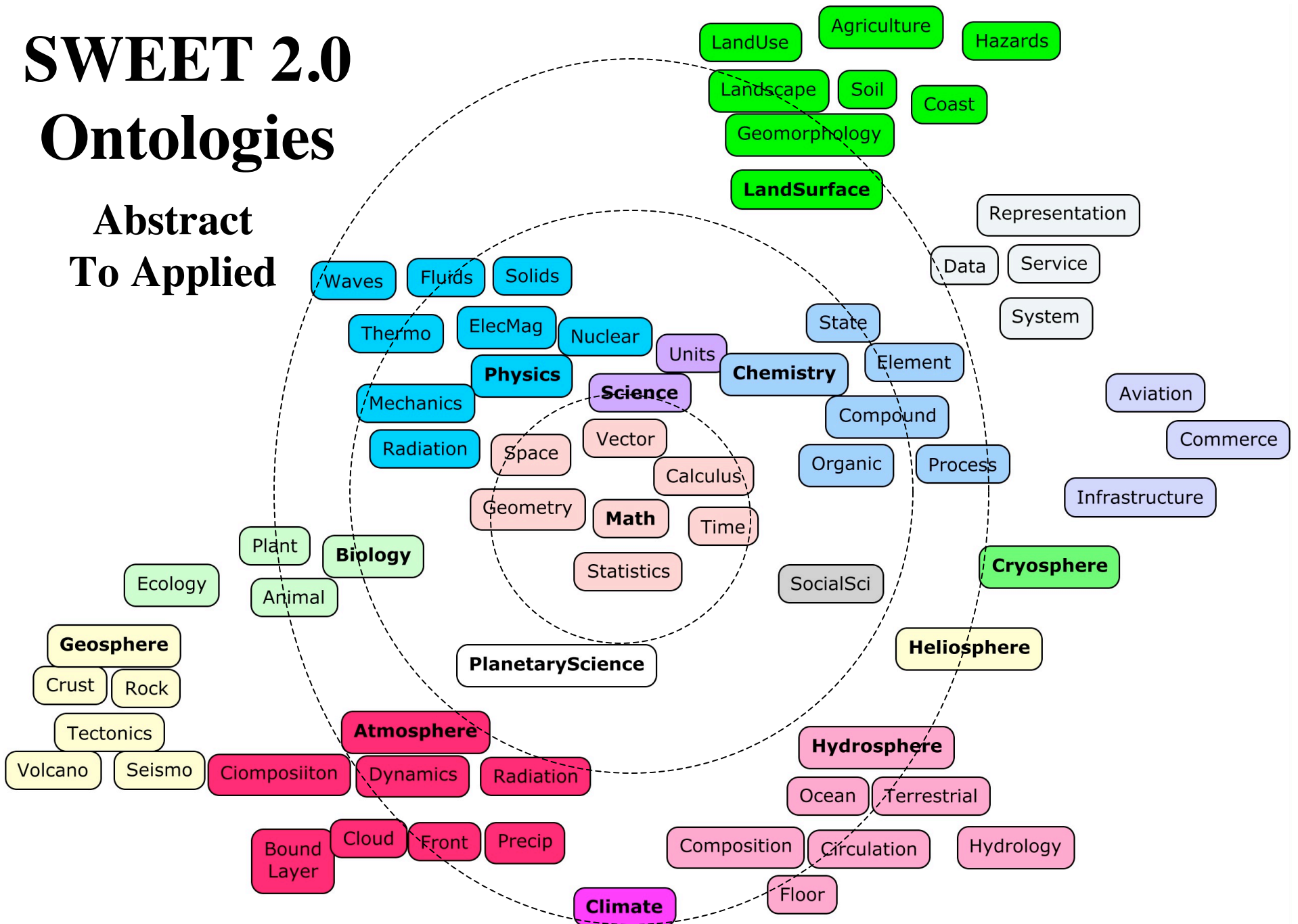
of Ontologies by Subject

• astro	4	• geol	9
• atmo	12	• human	6
• biol	6	• hydr/ocean	7
• chem	6	• math	5
• climate	1	• phys	12
• cryo	1	• sci	4
• data	3	• space	5
• geog	6	• time	2




SWEET 2.0 Ontologies

Abstract
To Applied



SWEET Classes by Function

- Process
- Phenomena
- Substance
- Property  **Units primarily used here**
- Space
- Time
- Math
- Planetary Realm

sciUnits Object Properties

- hasUnit and hasDefaultUnit
 - Separate properties enables applications to **override** hasDefaultUnit with hasUnit
 - Reasoners should look for hasUnit first; if not found, look for hasDefaultUnit
- derivedFromUnit
- hasPrefix
- math:hasPower, math:productOf

sciUnits Classes

- baseUnit
- simpleUnit
- derivedUnit
- complexUnit
- unitDerivedByScaling
- unitDerivedByShifting
- unitDerivedByRaisingToPower

sciUnits.owl Individuals

- All units represented as individuals
 - Instance of simpleUnit or derivedUnit or ...
- Units populated from the NCAR UDUnits package, widely used in the Earth system science community
- Includes all SI units and prefixes

sciUnits.owl Complex Units

- Many units defined by combinations of productOf and hasPower
- Many domain-specific units are found in the domain ontologies
 - In keeping with the “modularity” theme

Example: Power

```
<units:ComplexUnit rdf:ID="watt">  
  <math2:productOf rdf:resource="#joule"/>  
  <math2:productOf rdf:resource="#perSecond"/>  
</units:ComplexUnit>
```

In physElecMag.owl ontology:

```
<owl:Class rdf:about="#Power">  
  <rdfs:subClassOf>  
    <owl:Restriction>  
      <owl:hasValue rdf:resource="&units;#watt"/>  
      <owl:onProperty rdf:resource="&units;#hasDefaultUnit"/>  
    </owl:Restriction>  
  </rdfs:subClassOf>  
</owl:Class>
```