Terrestrial Ecosystem Research Network, Adelaide, Australia
March 23, 2015

Should environmental research infrastructure address the knowledge life-cycle, beyond the data life-cycle?

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@envinf

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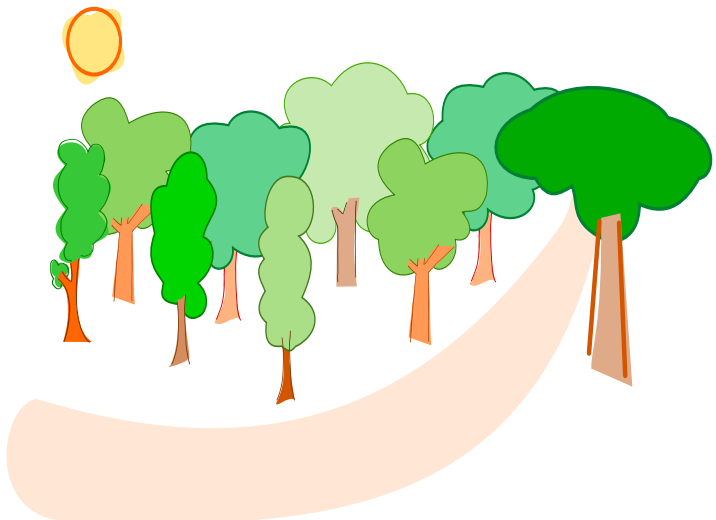
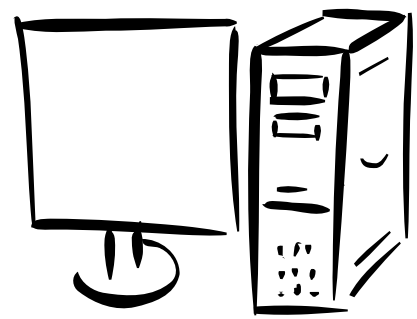
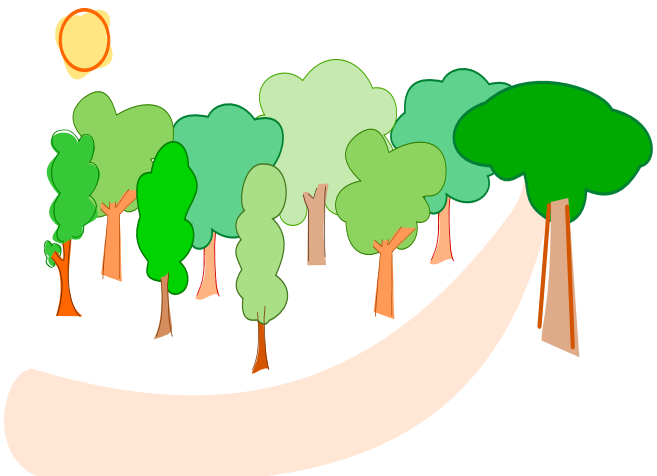
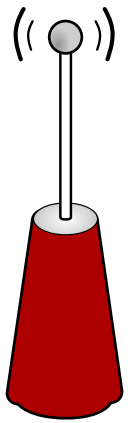
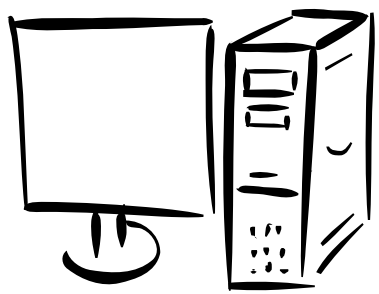
About me











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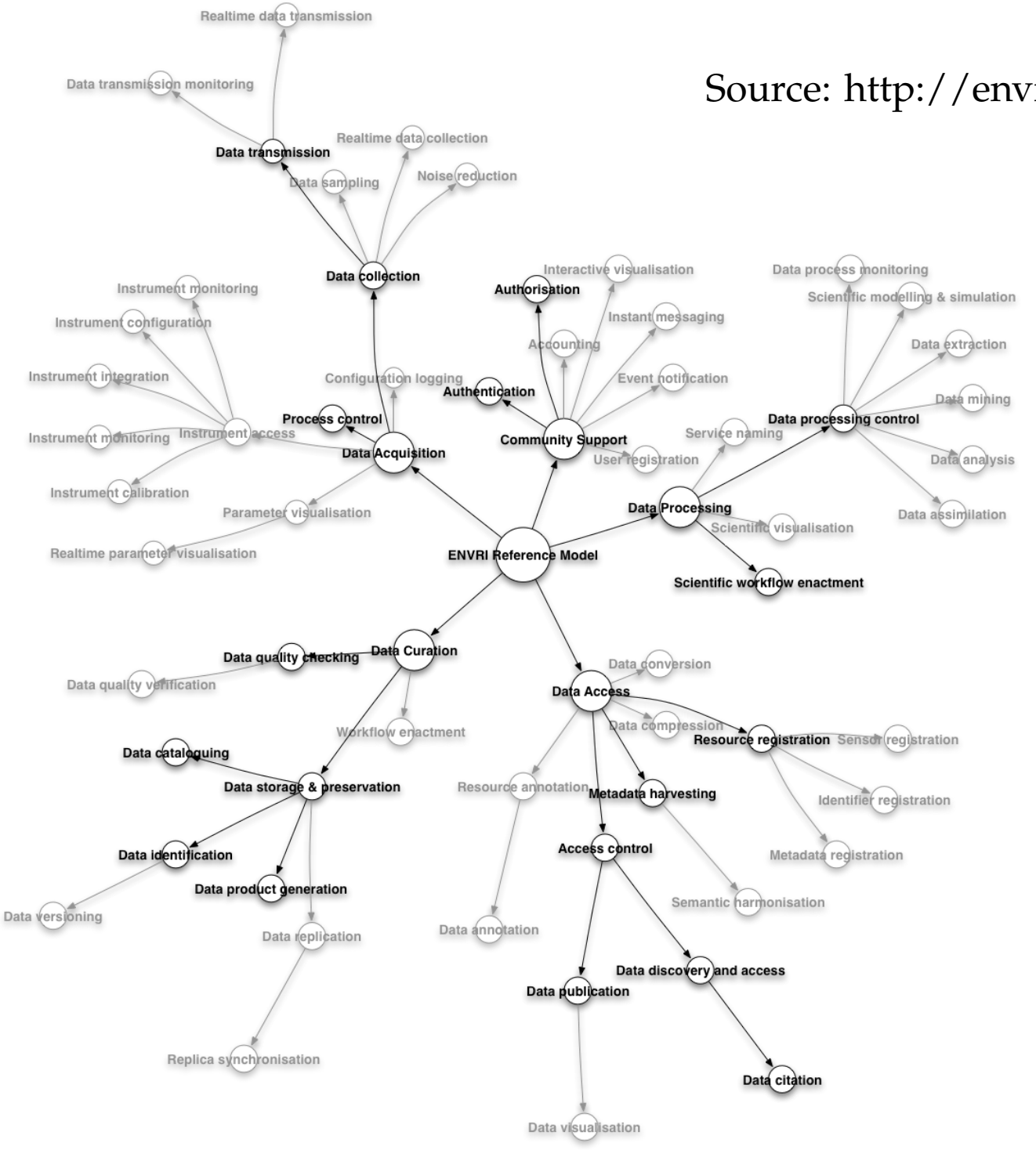
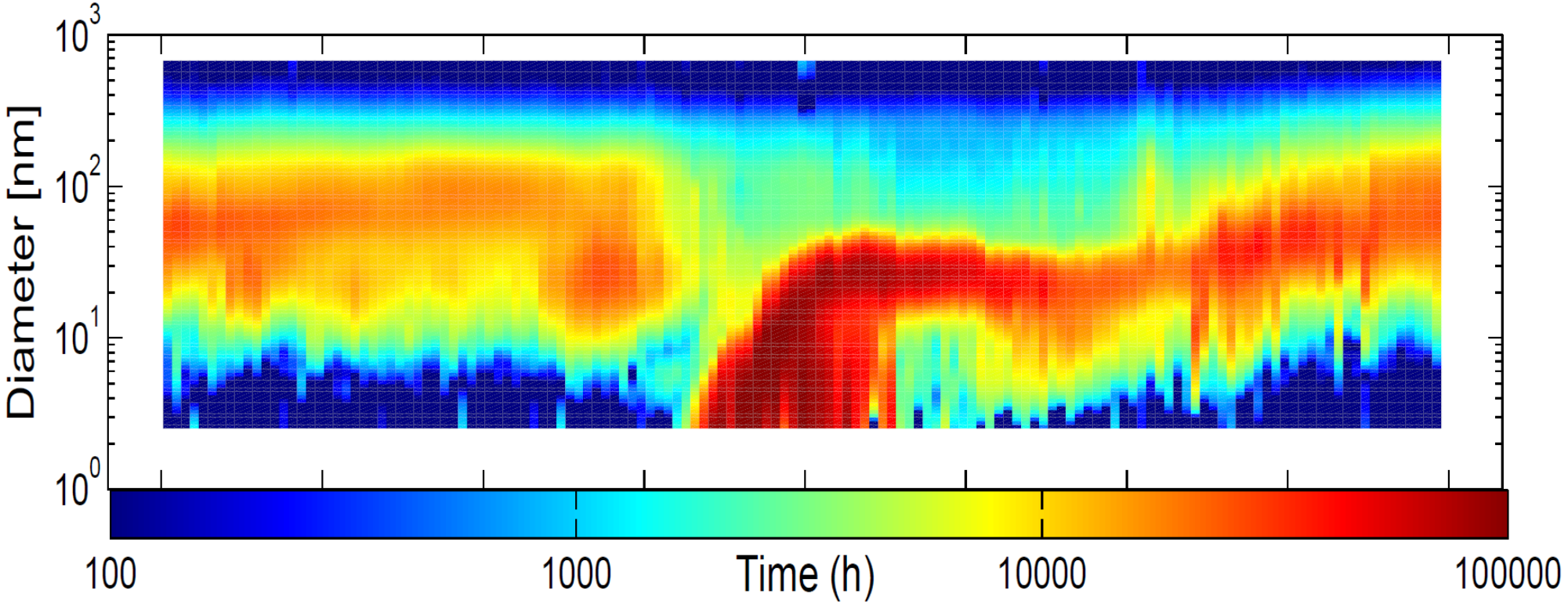
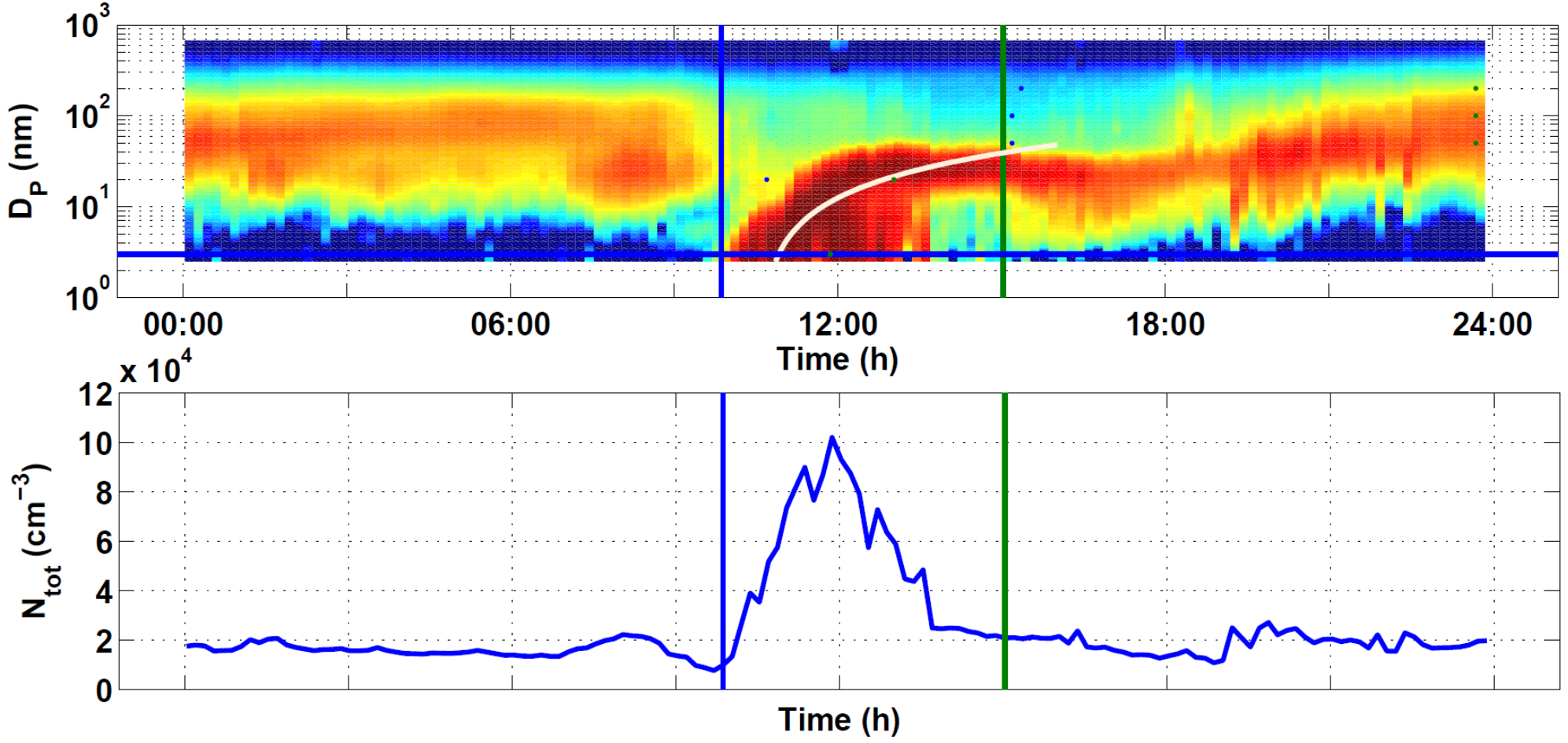
Source: http://envri.eu





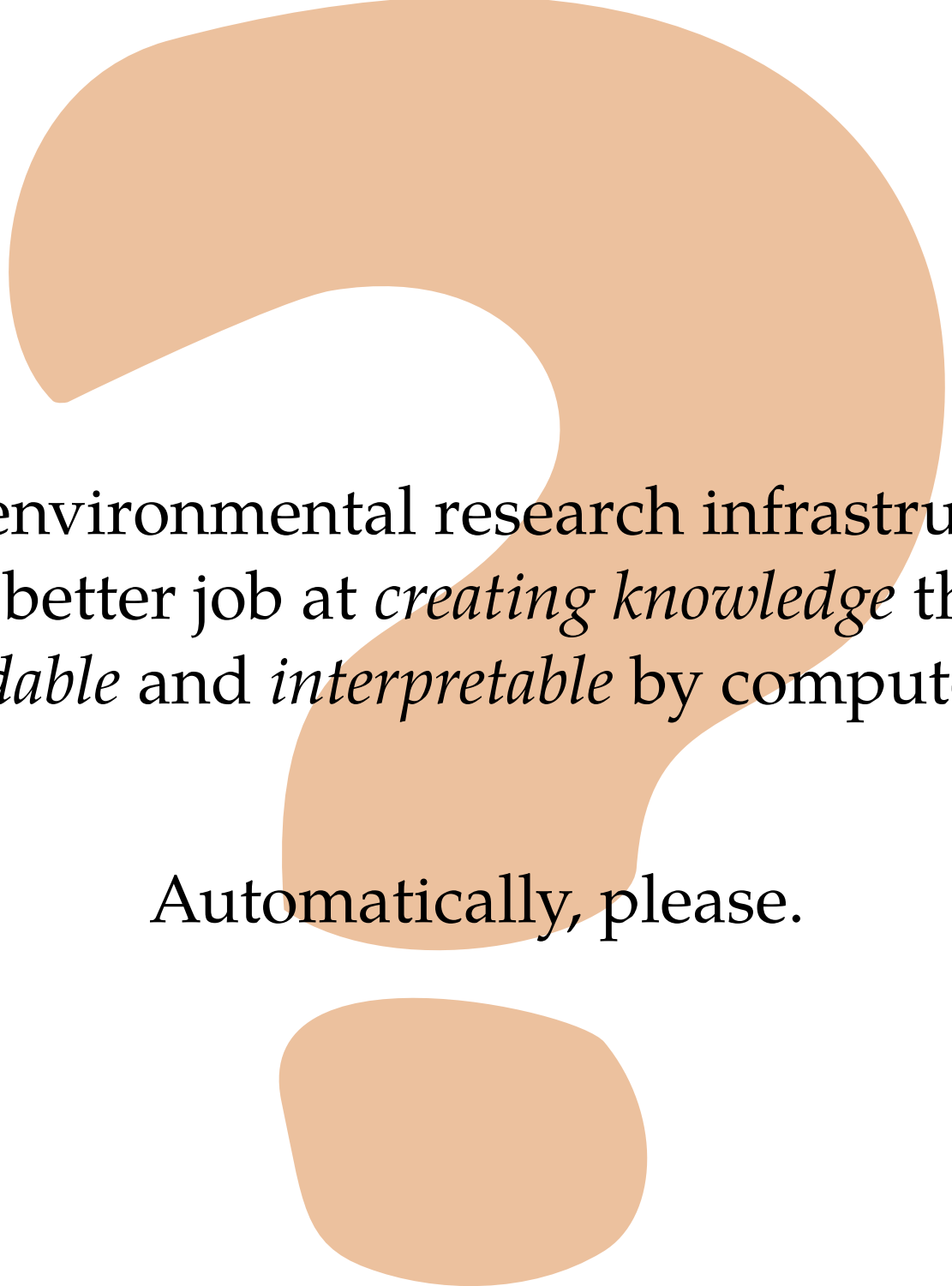
Source: Hamed et al. (2007). Nucleation and growth of new particles in Po Valley, Italy. *Atmospheric Chemistry and Physics*, 7, 355-376.



Source: Hamed et al. (2007). Nucleation and growth of new particles in Po Valley, Italy. *Atmospheric Chemistry and Physics*, 7, 355-376.

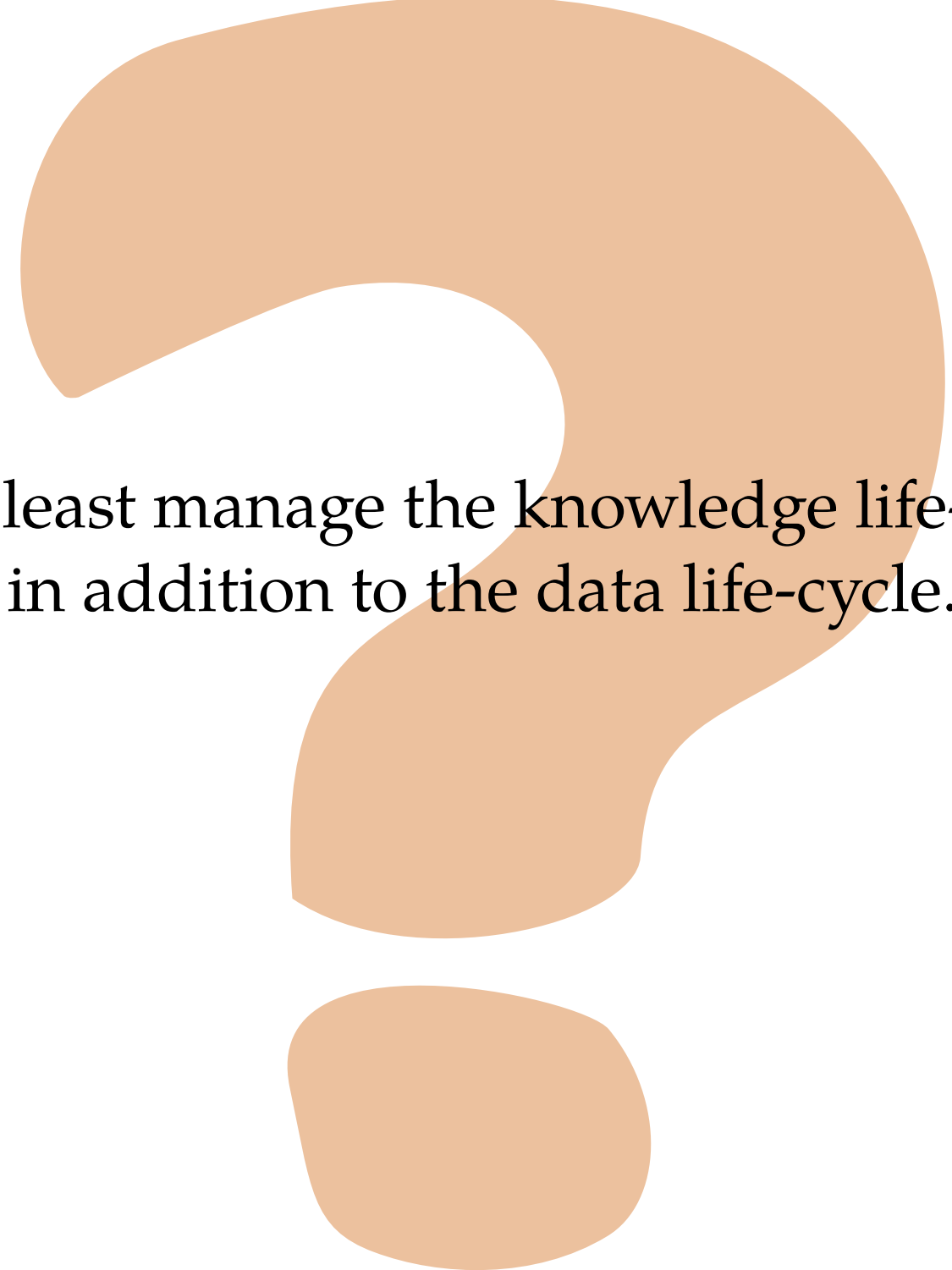
Month	Event start time	Event end time	Duration	Sunrise	Sunset
1	10:29	16:53	06:23	07:50	16:53
2	12:17	18:41	06:23	07:21	17:33
3	11:14	17:18	06:04	06:30	18:14
4	11:30	16:50	05:20	05:34	18:52
5	10:21	15:31	05:09	04:50	19:29
6	9:05	14:51	05:46	04:34	19:53
7	9:43	14:25	04:41	04:50	19:48
8	9:57	15:37	05:40	05:24	19:10
9	11:00	16:27	05:27	06:01	18:15
10	11:57	17:37	05:40	06:39	17:18
11	12:05	18:30	06:24	07:19	16:38
12	12:03	18:35	06:32	07:49	16:29
Min	09:05	14:25	04:41	04:34	16:29
Max	12:17	18:41	06:32	07:50	19:53
Mean	10:58	16:46	05:47	06:13	18:12
Median	11:07	16:51	05:43	06:15	18:14

Source: Hamed et al. (2007). Nucleation and growth of new particles in Po Valley, Italy. *Atmospheric Chemistry and Physics*, 7, 355-376.

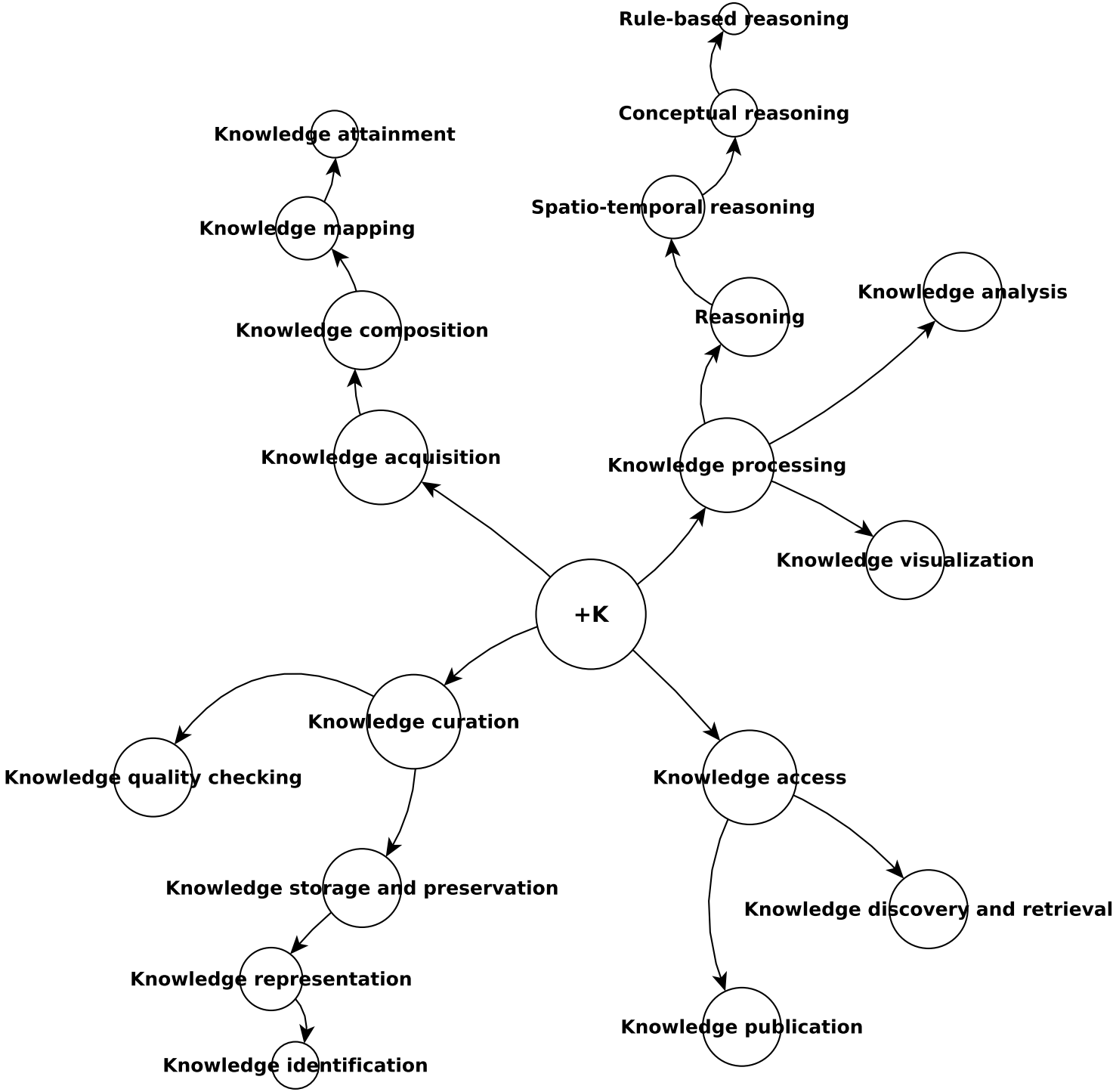


Can environmental research infrastructure do a better job at *creating knowledge* that is *readable* and *interpretable* by computers.

Automatically, please.

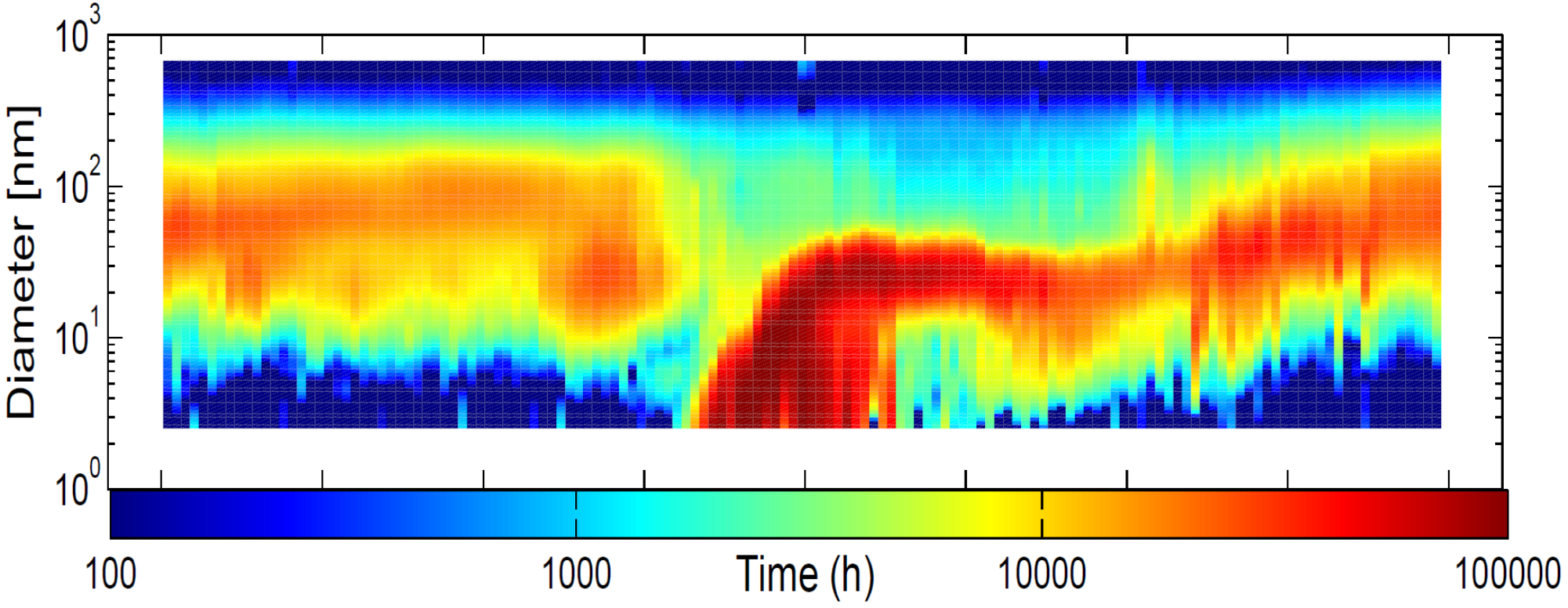


Or at least manage the knowledge life-cycle,
in addition to the data life-cycle.


Rule-based reasoning
Conceptual reasoning
Knowledge attainment
Spatio-temporal reasoning
Knowledge mapping
Knowledge analysis
Reasoning
Knowledge composition
Knowledge acquisition
Knowledge processing
Knowledge visualization
+K
Knowledge curation
Knowledge quality checking
Knowledge access
Knowledge storage and preservation
Knowledge discovery and retrieval
Knowledge representation
Knowledge publication
Knowledge identification

Situation

New particle formation situation



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≪ npf, 2014-08-11T10:30, PT5H30M, Kuopio, 1 ≫

Ontology

Query situations

```
select ?location ?time ?duration
where
a Situation [
   npf ;
   [ location ?location ] ;
   [ inXSDDateTime ?time ] ;
   [ hasDuration [
      hasAttributeValue [
         attributeValue ?duration
      ]
   ]
]
filter (?time >= "2014-08-01")
```

Take aways

- Important role of environmental sensor networks
- Big data collected from such networks
- Data makes little or no sense, we want knowledge
- Challenging data processing tasks
- Building environmental research infrastructure
- Address the data life-cycle
- How about the knowledge life-cycle
- Situational knowledge abstraction
- Utilize computational models to automate
- Represent situational knowledge using ontology