

Characterization of Water-Related Narratives in Local US Newspapers

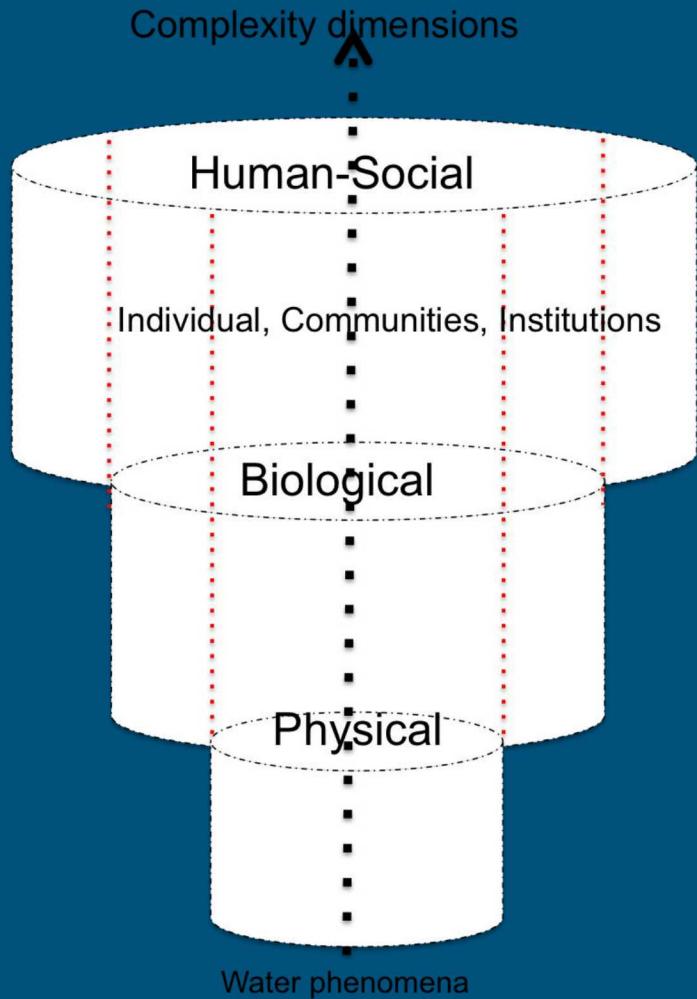
Kevin Comer
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Conor Finn
Jennifer Huff
Matthew Sweitzer

Evolution of Understanding

System-oriented perspective: Socio-ecological systems

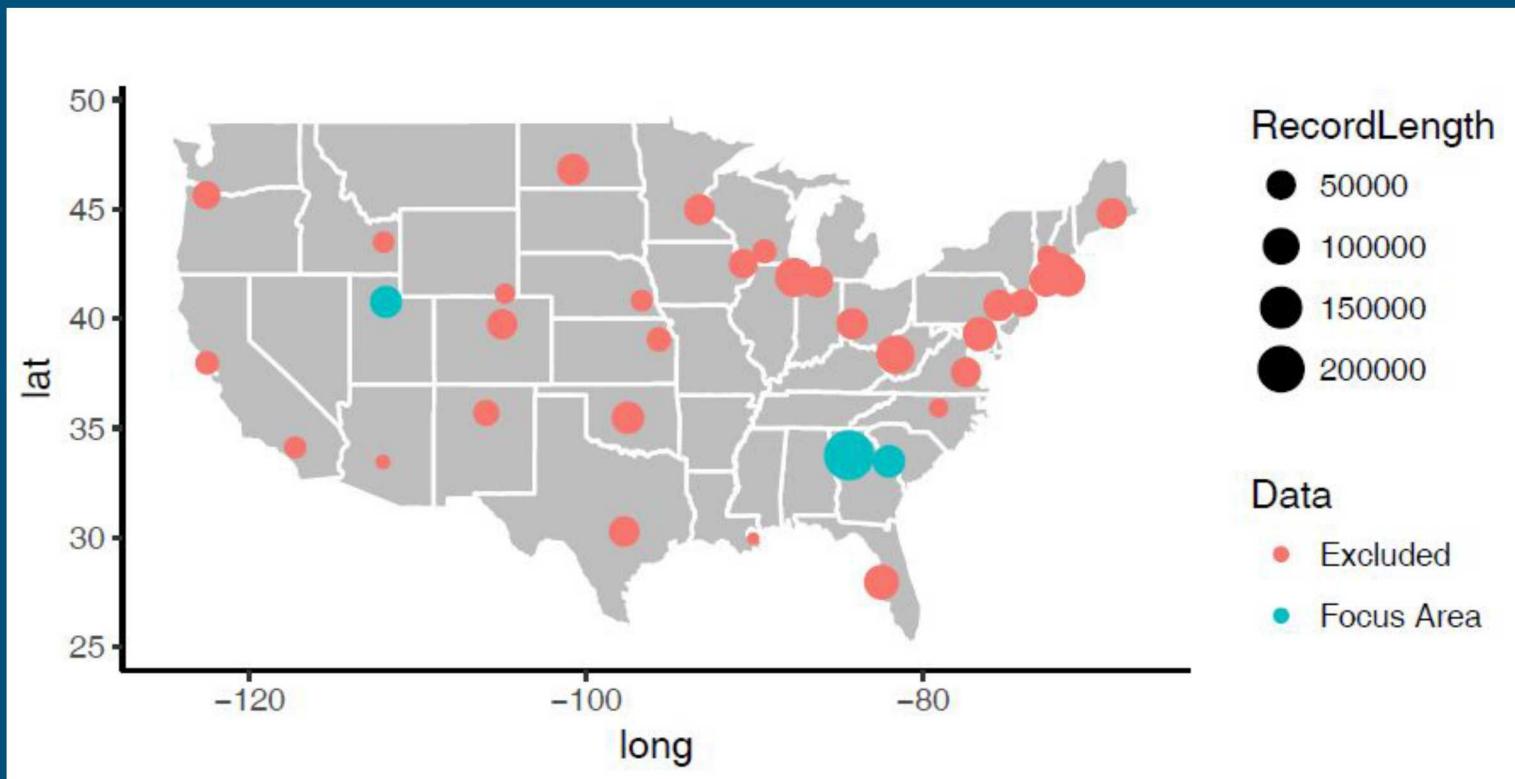
- Physical dynamics
 - Evaporation
 - Recharge
- Biological dynamics
 - Wetlands
 - Flora & Fauna
- Social dynamics
 - Agriculture, energy, & other economic needs
 - Recreation: swimming, fishing, ...
 - Culture: rituals...
 - Policy: planning, conservation, ...



“We have to fundamentally change the mindset of the public, and the way we manage this resource...and one of the ways you do it is, you have to change the terminologies that we use in dealing with water.”

- Newsha Ajami, a hydrologist and the director of urban water policy at Stanford University’s Water in the West program
(from High Country News’s Emily Benson “In the Southwest, ‘drought’ doesn’t tell the whole story”)

Dataset



Overview of Structural Topic Models

- Form of topic modeling (unsupervised)
- Groups documents based on FREX words
 - Frequently occurring within group
 - EXclusive to that group
- Includes procedures for determining topic count
- Allows for covariate specification with document metadata

Topics in Filtered Dataset

Hurricanes (3): forecasters, nino, landfall, typhoon, haiti

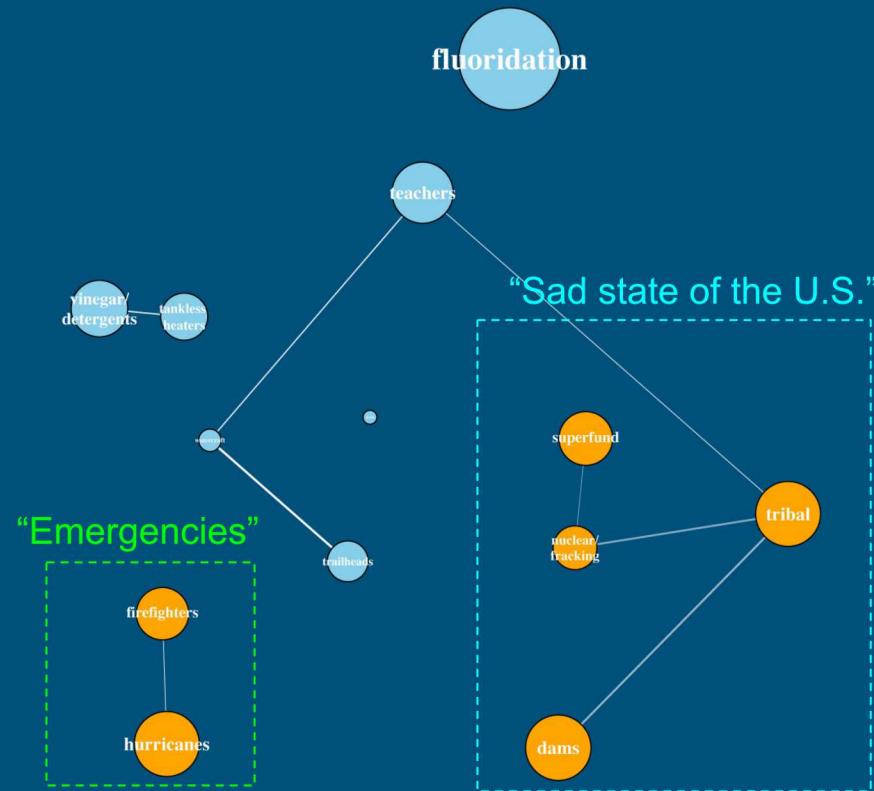
Dams (4): acre-feet, julander, cfs, chub, mussel

Firefighters (5): firefighters, blaze, arson, extinguished, smoldering

Tribal (7): tribe, tribal, rep, sitla, suwa

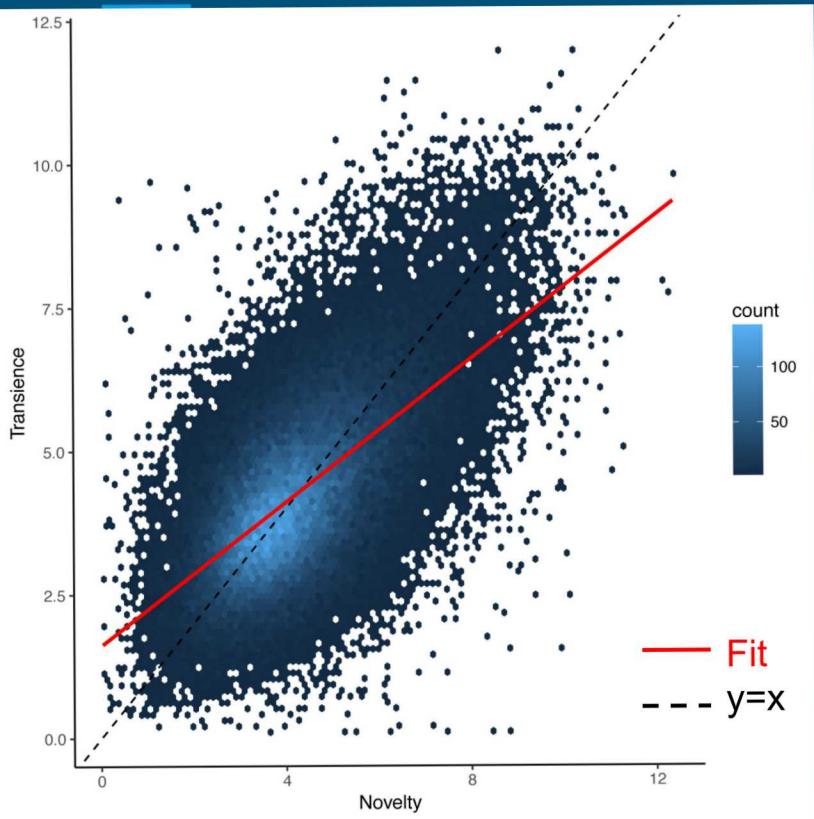
Superfund (8): arsenic, superfund, phosphorus, coliform, fecal

Nuclear/Fracking (9): nuclear, reactors, ethanol, deepwater, plutonium

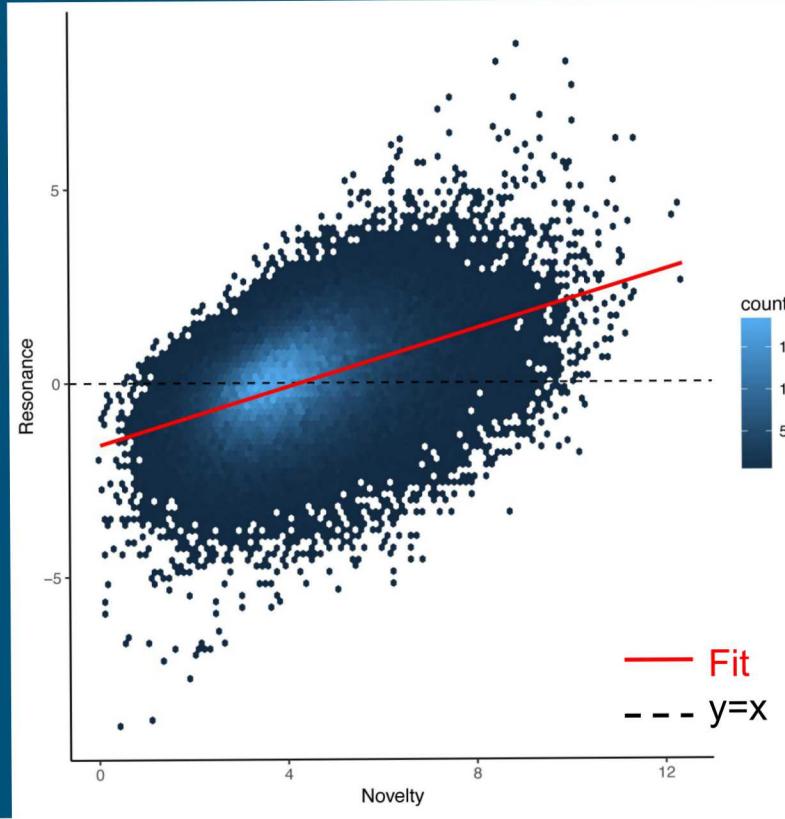


Novelty: “New-ness” of ideas given what you know about the past
Transience: Presence of the present given what you know about the future
Resonance: Difference from the past and leaving traces into the future

K-L Divergence

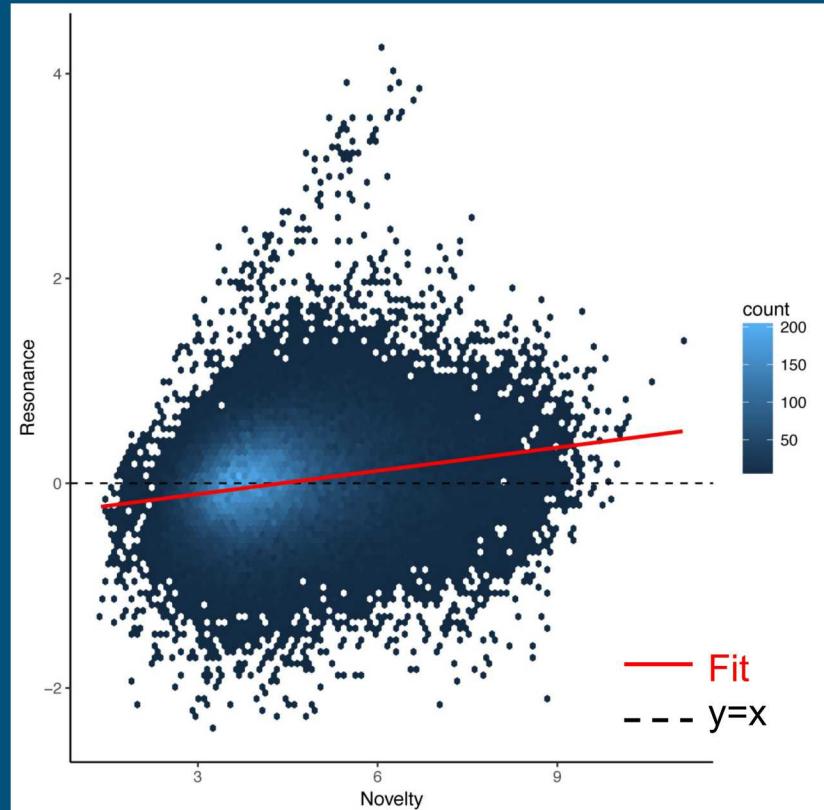
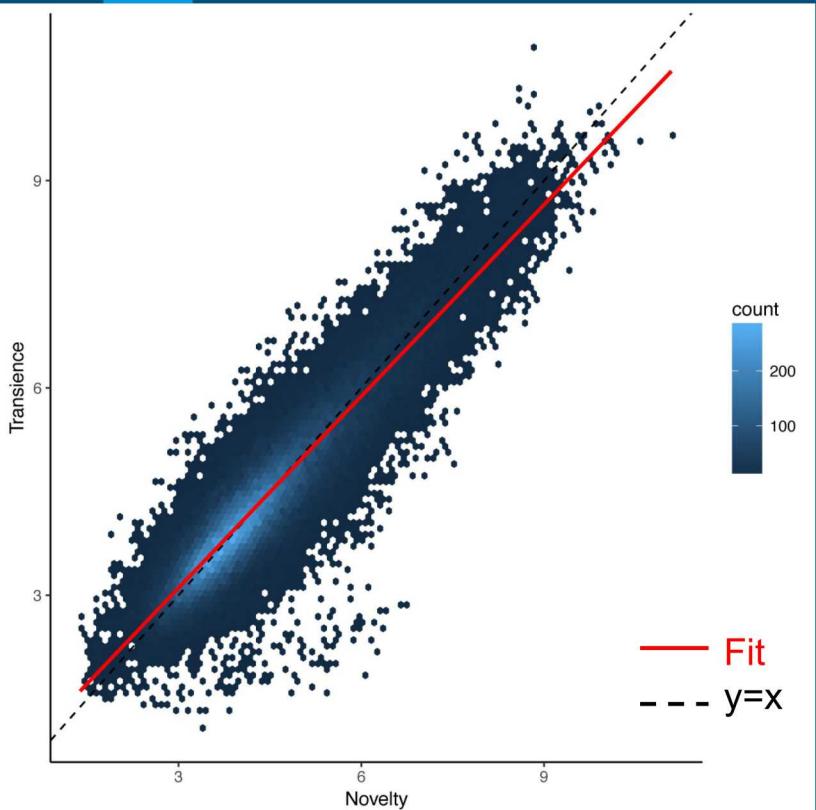


$W = 10$



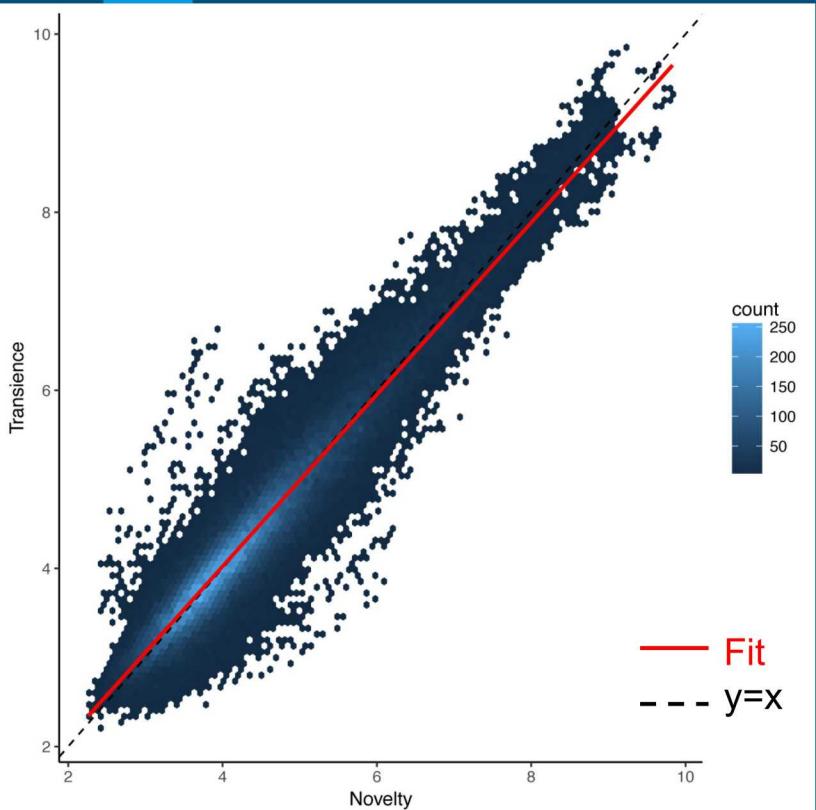
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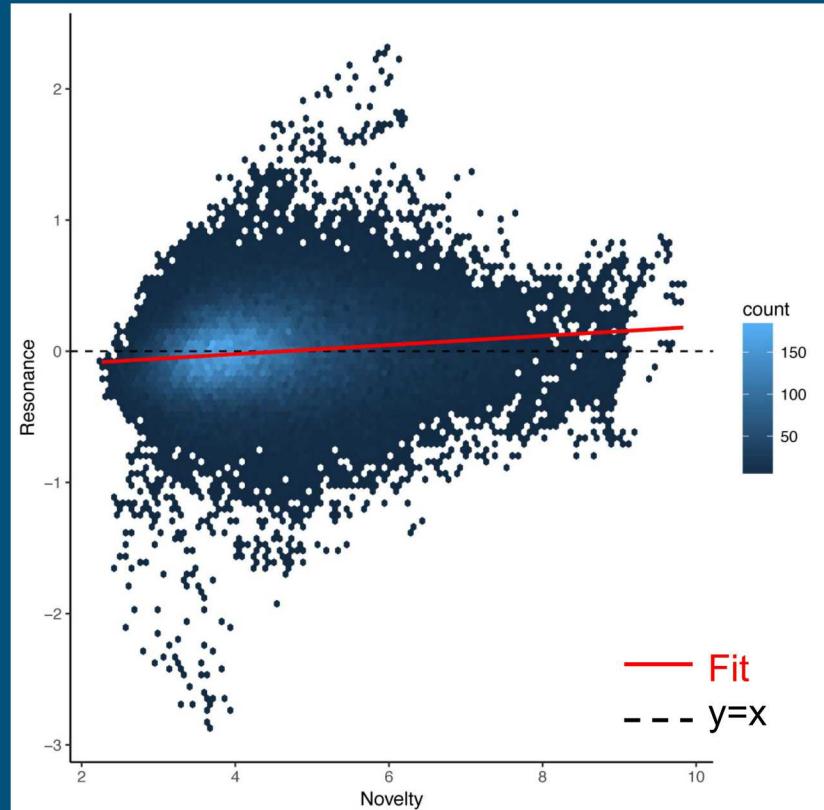


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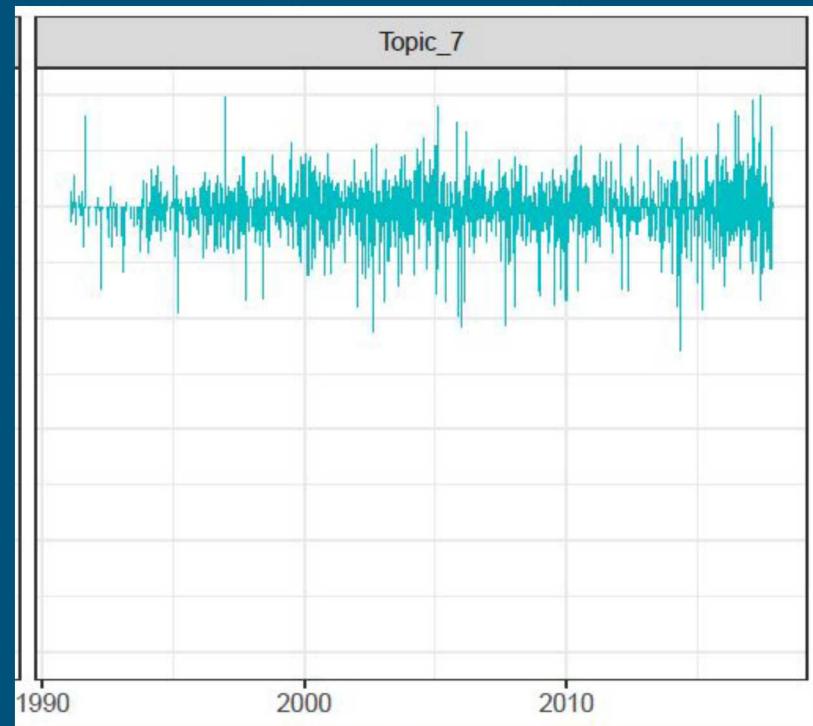
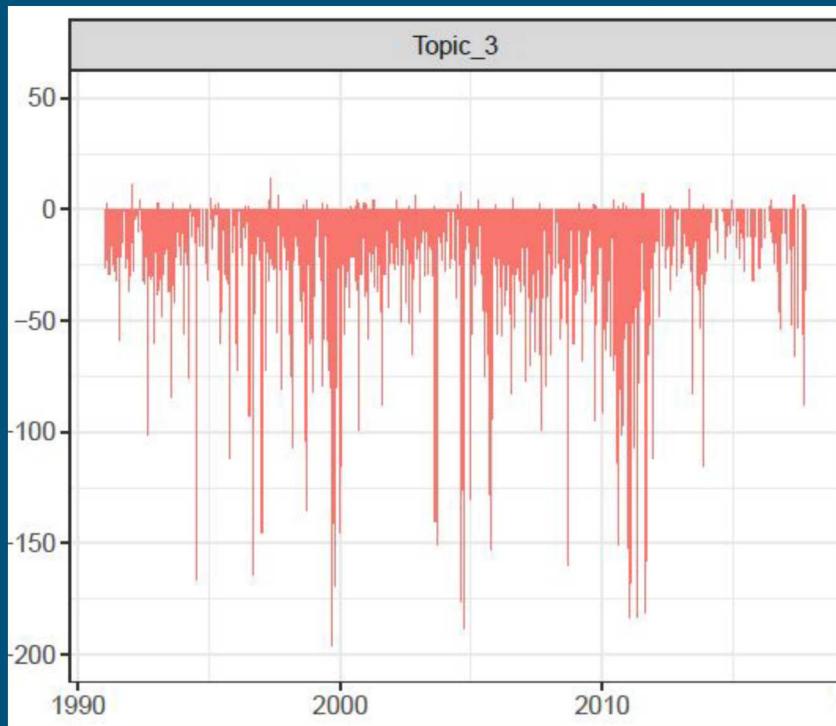
K-L Divergence



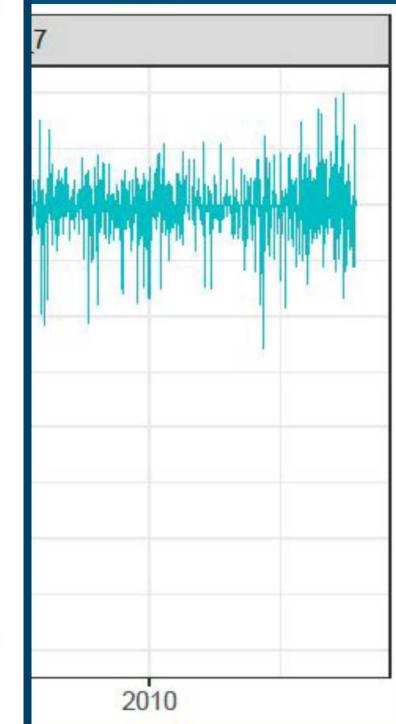
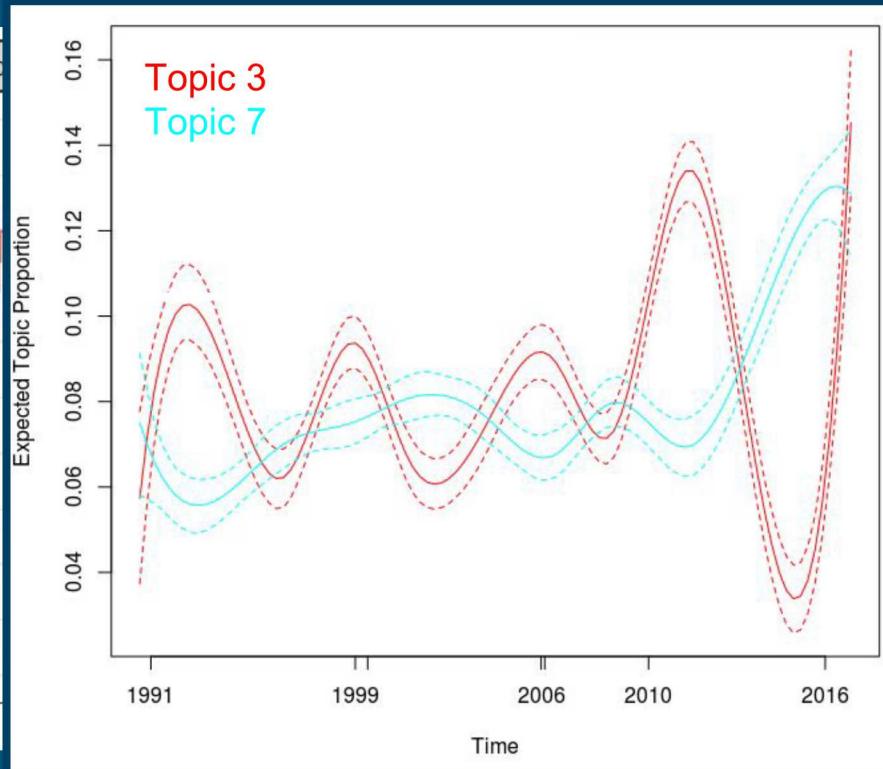
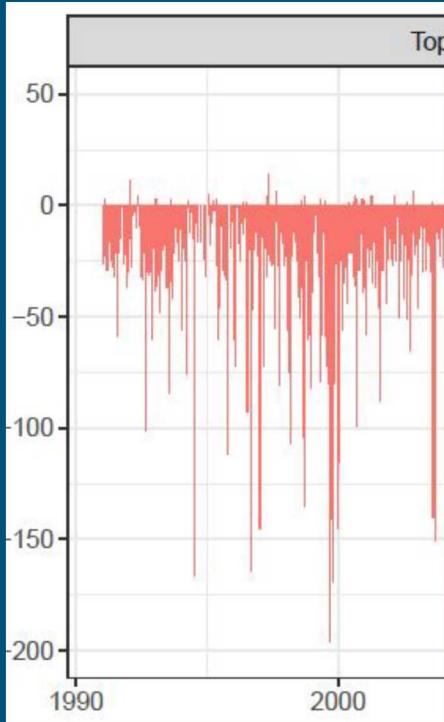
$W = 1000$



Patterns over Time

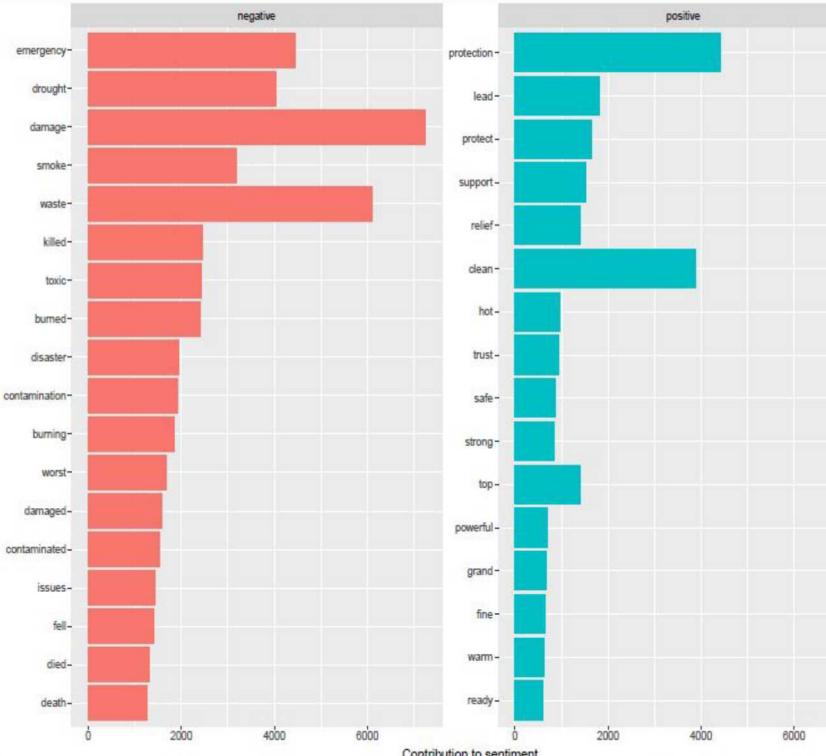
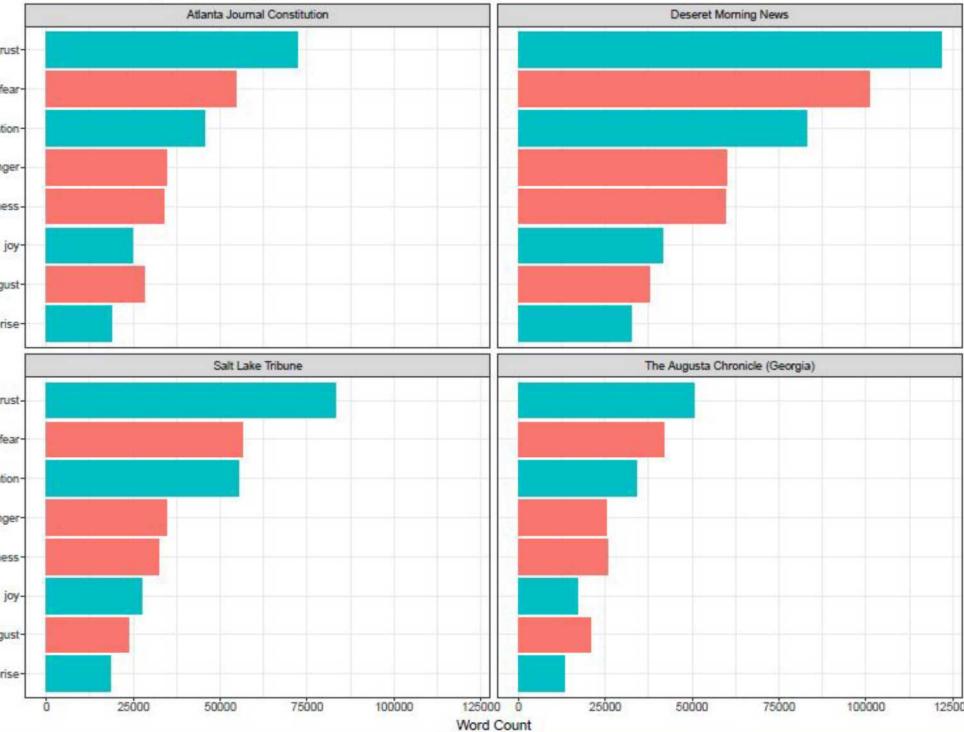


Patterns over Time



Sentiment Analysis

NRC Sentiment by Source



Failed Attempts

Running full newspaper dataset: too slow for our given timeframe :-)

Performing other metadata analysis (readership, watershed location, etc.)

Linking sentiment to changes in policy (increased litigation, regulation, etc.)

References

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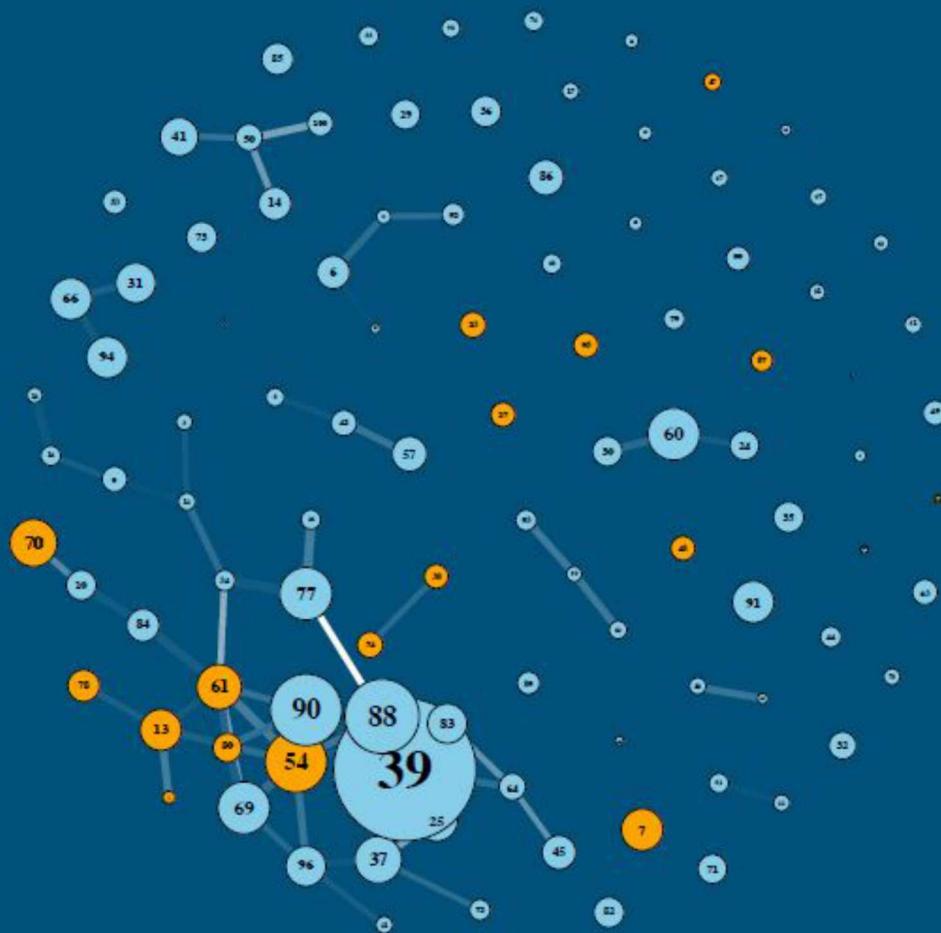
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Thanks!

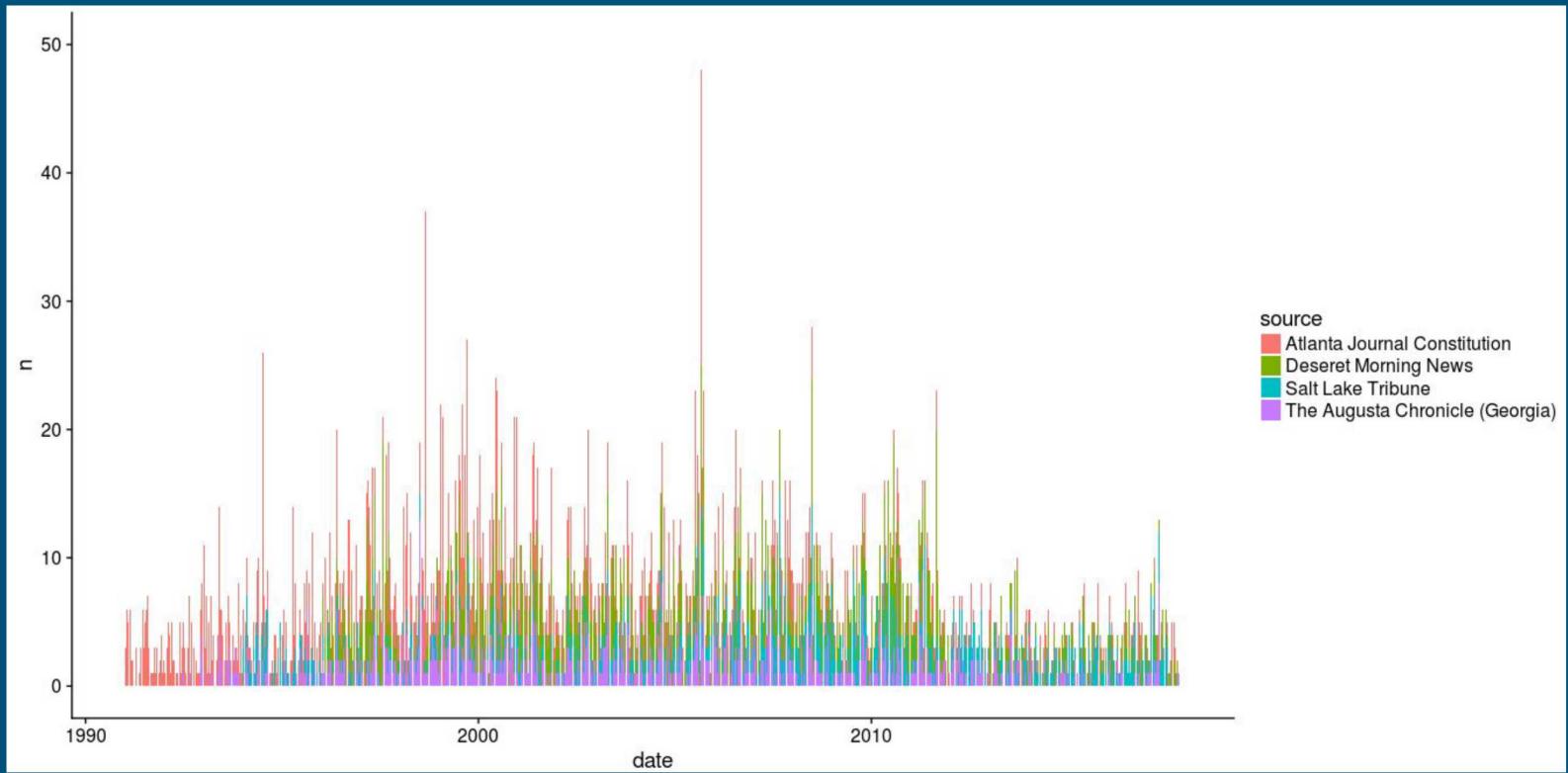
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- Simon Dedeo
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- Jennifer Dunne
- David Krakauer



Supplementary Slides

Number of Articles over Time



Initial Filtering

54: public, state, issues

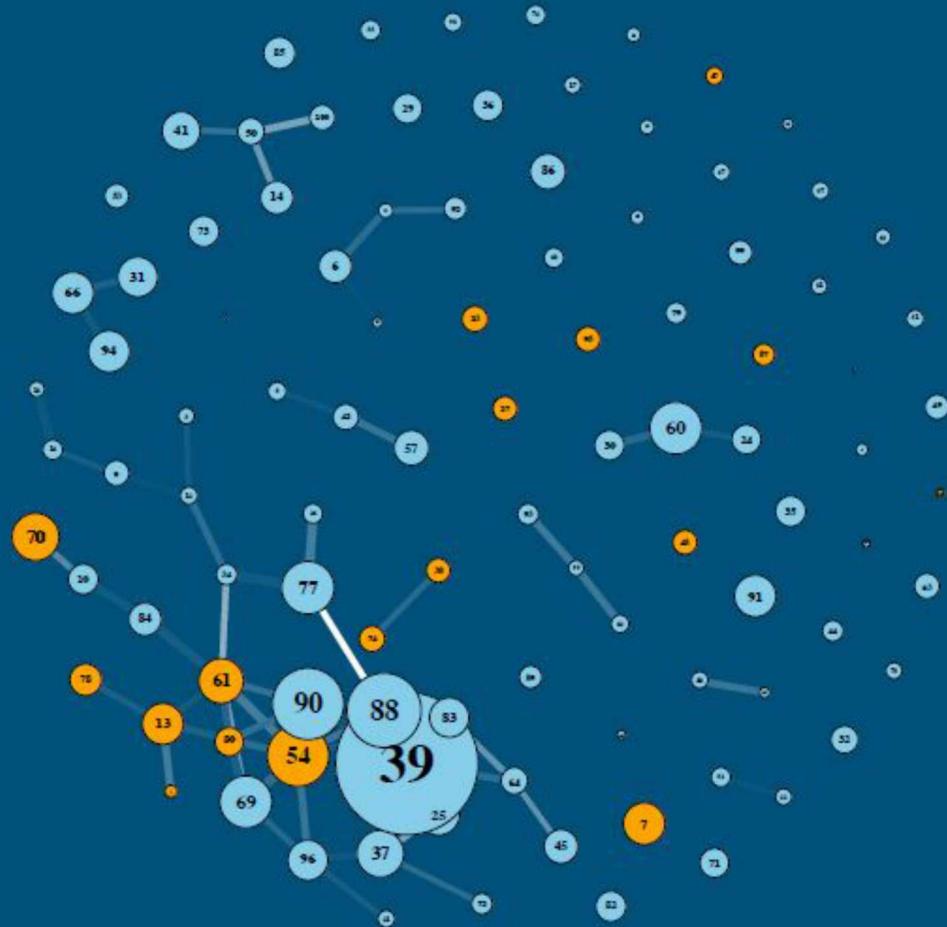
7: hurricanes, floods

13: sewage, treatment

70: plastic, towelettes

38: dam, lake, corps

23: hot, ice, weather



Stm model variations explored

Compared stm model without metadata, with metadata, and with prevalence

Topic coherence was similar across the 3 versions of the stm models

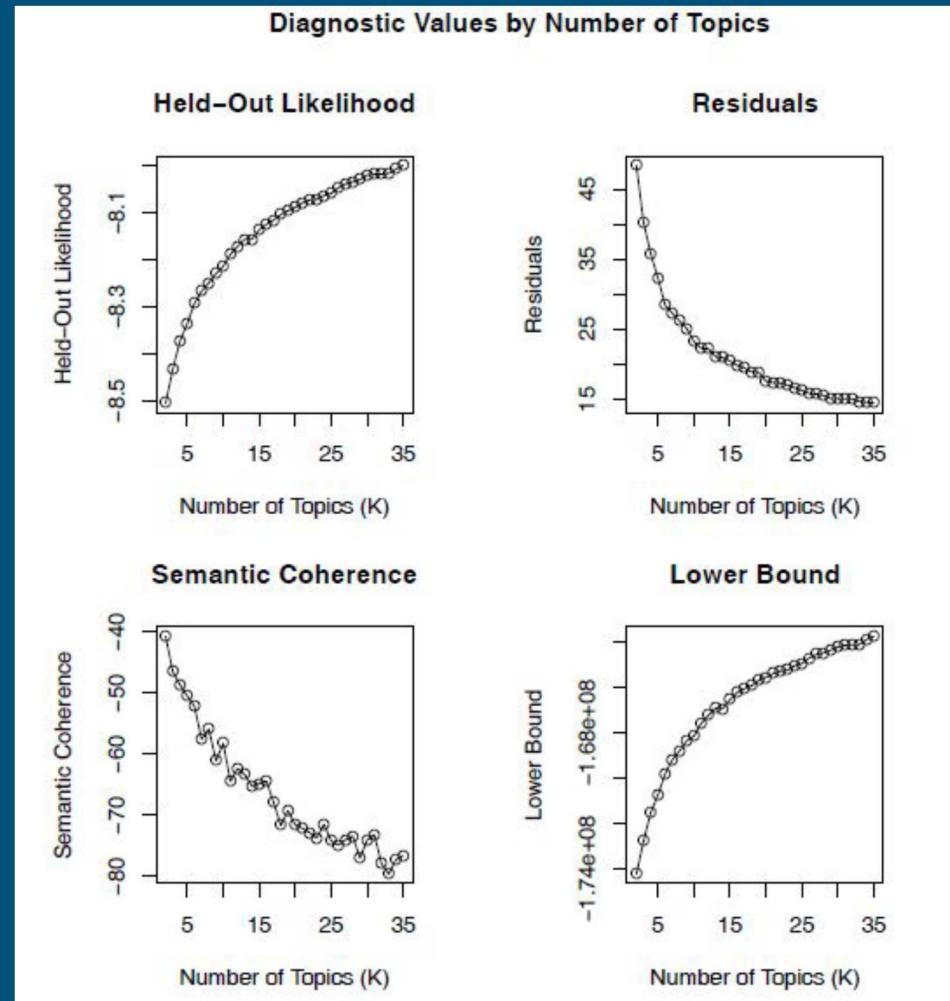
Opted to keep stm with prevalence info to enable exploration of metadata effects

searchK results

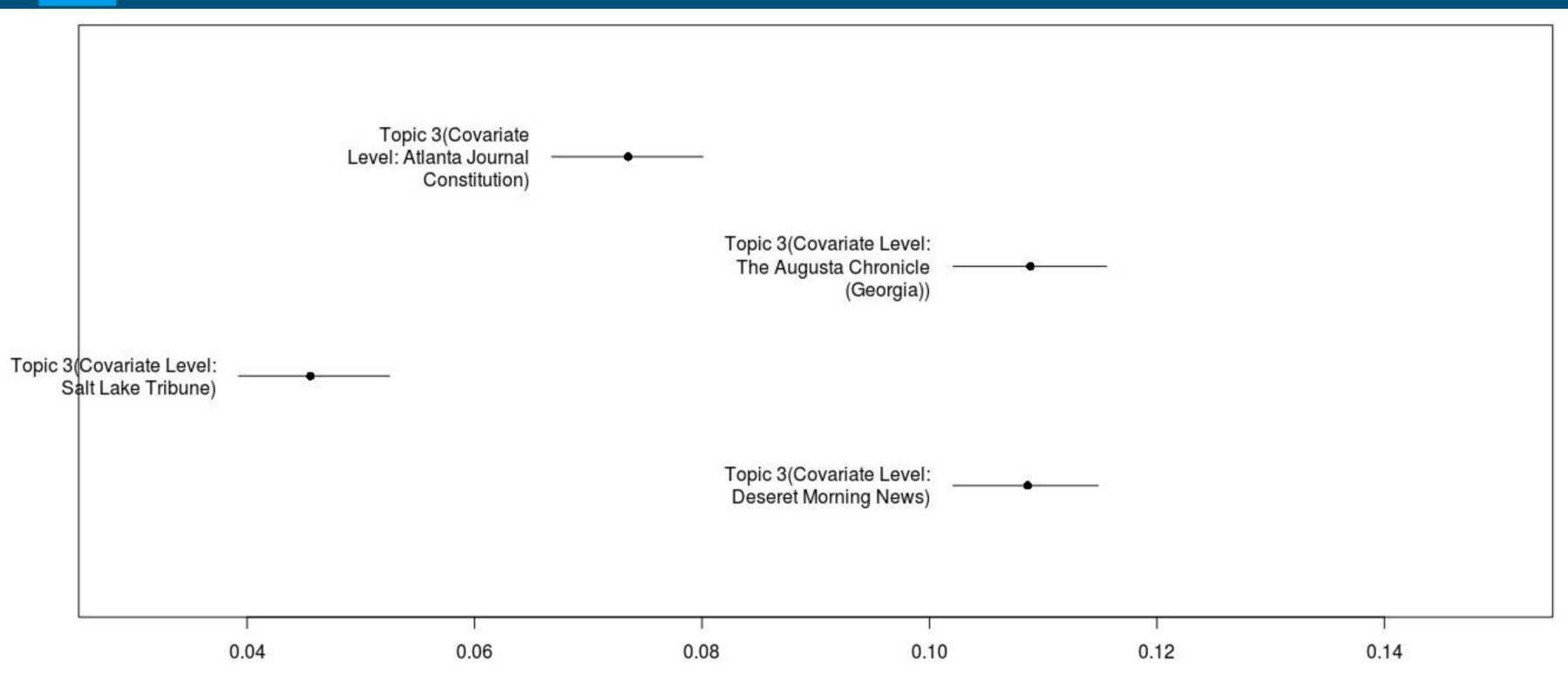
Executed searchK on the filtered corpus of ~85K articles

Observed slight kink in semantic coherence at K=20

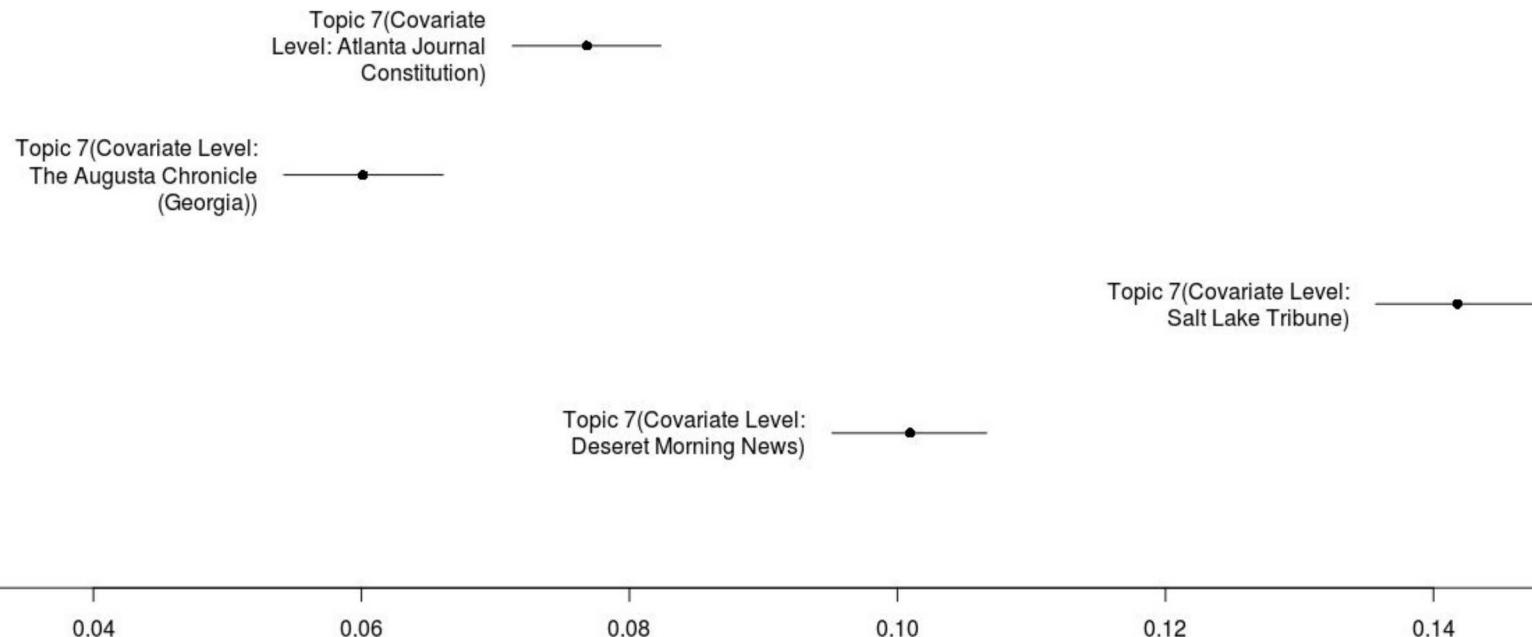
Chose K=20 for 2nd round stm analysis



Variations across Newspapers: Topic 3



Variations across Newspapers: Topic 7



Literature Review

Concepts and approaches to main water management.

1. Integrated Water Resources Management
2. One Water

International conferences and conventions on water management cover a range of topics.

- Introduction of water in political agenda?
- Actions and guidelines principles
- Stakeholders decisions
- Good governance
- Public participation
- Water policy

Timeline

