

The Teletherm

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Principles of Complex Systems, Vols. 1, 2, & 3D
CSYS/MATH 300, 303, & 394, 2022-2023 | @pocsvox

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Computational Story Lab | Vermont Complex Systems Center
Santa Fe Institute | University of Vermont



The PoCSverse
The Teletherm
1 of 25

Groundhog Day

Solstices

Cherry blossoms

Teletherms

References



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The PoCSverse
The Teletherm
2 of 25

Groundhog Day

Solstices

Cherry blossoms

Teletherms

References

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The PoCSverse
The Teletherm
3 of 25

Groundhog Day



Solstices

Cherry blossoms

Teletherms

References



 On Instagram at [pratchett_the_cat](https://www.instagram.com/pratchett_the_cat) 

Outline

The PoCSverse
The Teletherm
4 of 25

Groundhog Day

Solstices

Cherry blossoms

Teletherms

References

Groundhog Day

Solstices

Cherry blossoms

Teletherms

References



The existential temporal escape room: [↗](#)



The PoCSverse
The Teletherm
5 of 25

[Groundhog Day](#)

[Solstices](#)

[Cherry blossoms](#)

[Teletherms](#)

[References](#)

The existential temporal escape room: [↗](#)

[Groundhog Day](#)

[Solstices](#)

[Cherry blossoms](#)

[Teletherms](#)

[References](#)



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The PoCSverse
The Teletherm
5 of 25

[Groundhog Day](#)

[Solstices](#)

[Cherry blossoms](#)


[Teletherms](#)

[References](#)



Groundhog day story things:



Time loop movies achieves Wikipedia list status 

The PoCSverse
The Teletherm
6 of 25

Groundhog Day



Solstices


Cherry blossoms

Teletherms






References

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 Also basically every video game is a Groundhog day situation.









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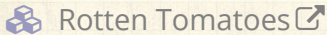
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-  2017-08-08: Bill Murray went to the see the musical on the opening night, unannounced. Took photos with the cast afterwards.
-  And then went to see it again on the [second night](#). 

The reviews:



GROUNDHOG DAY

PG 1993, Comedy/Romance, 1h 36m





97%

TOMATOMETER
86 Reviews




88%

AUDIENCE SCORE
250,000+ Ratings

 "Generally favorable" according to metacritic:
60 to 90 

End points:



A 90 rating  on Metacritic from the Washington Post:

“With a script as beautifully complex as this one, Ramis and his cast have half of their work done for them. There is a moral to the tale as well, and it even strikes an uplifting note. But, for once, the audience isn’t forced to surrender its intelligence (or its healthy cynicism) to embrace the film’s sunny resolution.”

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A [60 rating](#) on Metacritic, somehow also from the Washington Post:

The trouble is, you'll feel like you've been through too many same days yourself. With its zany daily episodes, ["Groundhog" gets stuck in a non-progressive repetition.](#)

Living in the Big Tick Tock:

Predictable photon delivery:

 Solstice  = "Sun + stand still"



The PoCSverse
The Teletherm
9 of 25

Groundhog Day

Solstices


Cherry blossoms

Teletherms

References

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The PoCSverse
The Teletherm
10 of 25

Groundhog Day

Solstices

Cherry blossoms



Teletherms

References





Solstices have some complications:

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7:29 am, December 30, 2021–January 9, 2022


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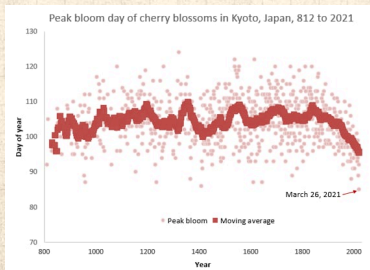
-  June 20/21-ish: Northern hemisphere's estival solistice and the Southern hemisphere's hibernal solstice.
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-  Latest sunrise in Burlington, Vermont?
7:29 am, December 30, 2021–January 9, 2022
-  Varies across latitudes and planets.

Cherry blossoms: The 12 hundred year data set

 WaPo, 2017: Japan's cherry blossoms signal warmest climate in more than 1,000 years 

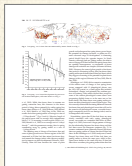
 WaPo, 2021: Japan's Kyoto cherry blossoms peak on earliest date in 1,200 years, a sign of climate change 


 Data: <http://atmenv.envi.osakafu-u.ac.jp/aono/kyophenotemp4/>



First leaves:

Finding the same trend towards earlier seasons, but detected using a different method—the date of first leaves in spring—and across the entire northern hemisphere:



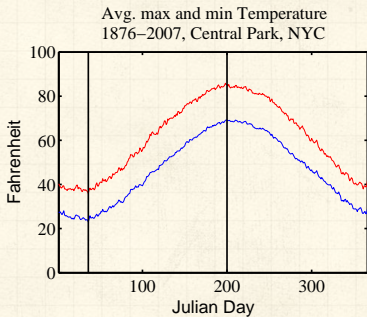
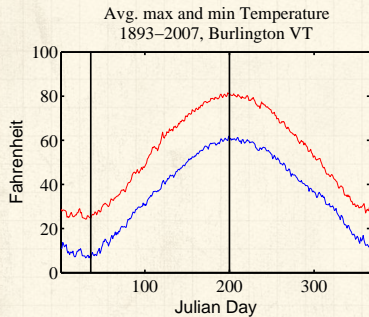
“Onset of spring starting earlier across the Northern Hemisphere” 

Schwartz, Ahas, and Aasa,
Global Change Biology, **12**, 343–351,
2006. ^[2]

From found 2009 notes:

- ☼ Frigistic (winter) and Thermistic (summer)
- ☼ Conflation of measurable with important (delicate) Importance of statistical measurements. Appreciation of randomness, good to encode. The teletherm. Solstice.
- ☼ I propose that the statistically coldest and warmest days of the year be known as the teletherms, and that these days should be recognized. The word teletherm derives from the Greek roots for end or terminal (telos-) and heat (-therm), in analogy with solstice (Latin for sun-stop). The hibernal teletherm falls roughly on January 31, and the esteval teletherm on July 31.
- ☼ The solstices and equinoxes have been celebrated by human civilizations for thousands of years, and their measurement
- ☼ Equitherms.
- ☼ Groundhog day!!! February 3
- ☼ July 17 (July 16 in a Leap Year)
- ☼ January 25 = day when 50% of years have experience their coldest day for the winter.
- ☼ thermological winter
- ☼ Imbolc one of the cross-quarter days, halfway between the winter solstice and the vernal equinox
- ☼ Candlemas

The Teletherm, an early conception:



Hibernal Teletherm \approx February 4.



Halfway between Winter Solstice and Spring Equinox



Bonus: [Groundhog Day](#)[↗], [Imbolc](#)[↗], ...



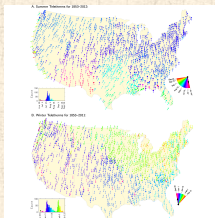
Aesteval Teletherm \approx July 19 (164 days later).



“Tracking the Teletherms: The spatiotemporal dynamics of the hottest and coldest days of the year”

Dodds, Mitchell, Reagan, and Danforth.

PLoS ONE, **11**, e0154184, 2016. [1]



The PoCSverse
The Teletherm
16 of 25

Groundhog Day

Solstices

Cherry blossoms

Teletherms

References



Explore Teletherms online at <http://teletherm.org>



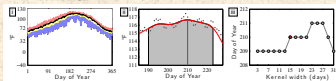
The wrongness: 6000 Figures/300MB of Supplementary Information.



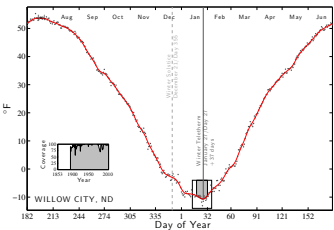
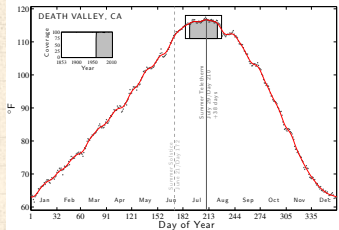
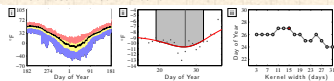
Follow [@teletherm](https://twitter.com/teletherm)



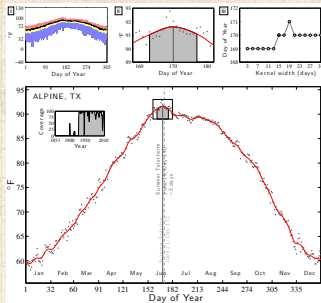
A. Hottest Summer Teletherm:



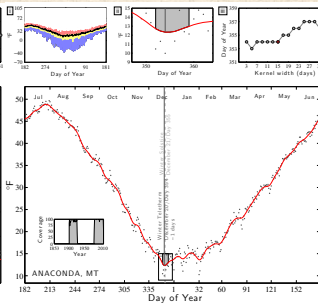
B. Coldest Winter Teletherm:



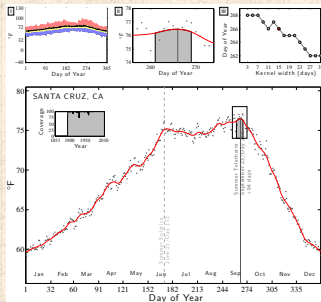
A. Earliest Summer Teletherm:



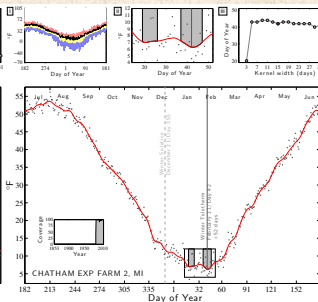
B. Earliest Winter Teletherm:



C. Latest Summer Teletherm:



D. Latest Winter Teletherm:



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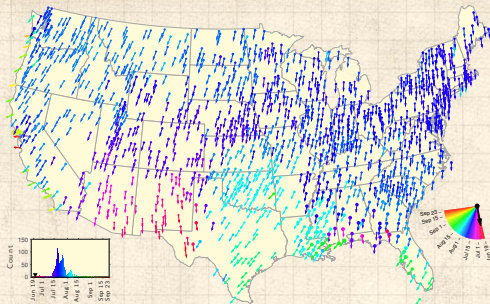
Solstices

Cherry blossoms

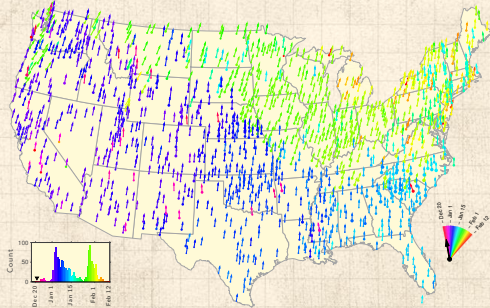
Teletherms

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A. Summer Teletherms for 1853–2012:



B. Winter Teletherms for 1853–2011:



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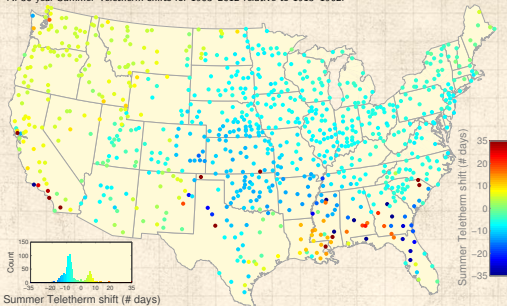
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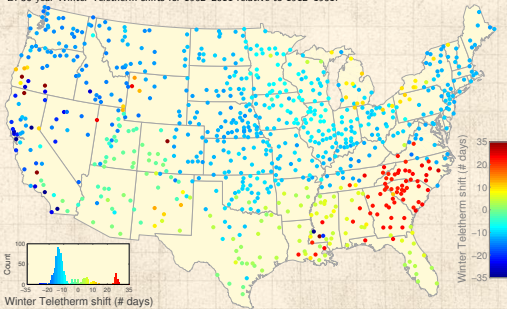
Teletherms

References

A. 50 year Summer Teletherm shifts for 1963–2012 relative to 1913–1962:



B. 50 year Winter Teletherm shifts for 1962–2011 relative to 1912–1961:



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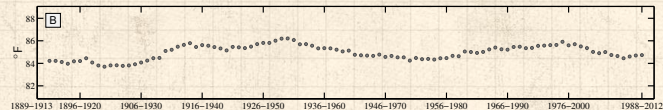
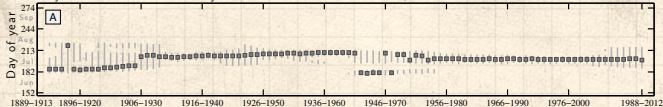
Solstices

Cherry blossoms

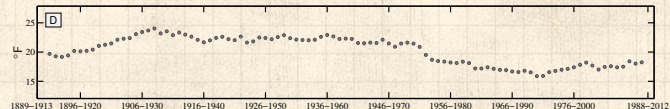
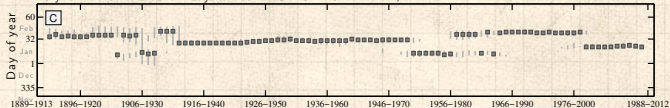
Teletherms

References

25 year Summer Teletherm dynamics for UNIONTOWN 1 NE, PA:



25 year Winter Teletherm dynamics for UNIONTOWN 1 NE, PA:



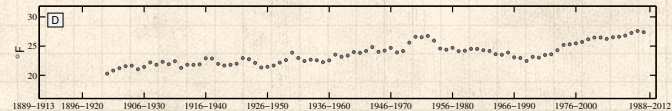
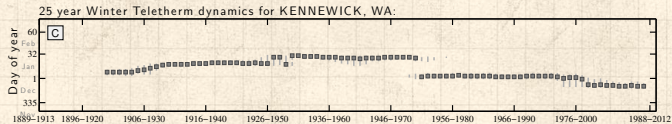
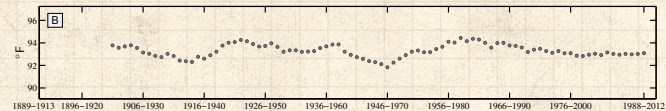
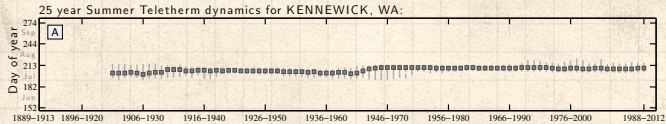
Groundhog Day

Solstices


Cherry blossoms



Teletherms

References



Unfinished work:

 Teletherm switching.

 The full site teletherm.org  and a paper.

References I

The PoCSverse
The Teletherm
25 of 25

Groundhog Day

Solstices

Cherry blossoms

Teletherms

References

- [1] P. S. Dodds, L. Mitchell, A. J. Reagan, and C. M. Danforth.
Tracking the Teletherms: The spatiotemporal dynamics of the hottest and coldest days of the year.

[PLoS ONE, 11:e0154184, 2016. pdf](#) 

- [2] M. D. Schwartz, R. Ahas, and A. Aasa.
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