

Climate Change and Environmental Issues in the Media: a Vermont Strategy

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How I Communicate Climate Change to the Public

- **Rutland Herald/Barre-Montpelier Times Argus Environment page: Jan. 2008-present**
 - **Solicited feature articles**
 - **6 columnists**
 - **I am one columnist & the technical advisor to section editor**
- **VT Public Radio Commentator**
- **Talks to schools, professional and citizens groups** [nearly 100 in past five years]
- **Web-site: <http://alanbetts.com>**

Newspaper Columns

37 articles: 2008-2011:

Annual collections at alanbetts.com/writings

- **List of topics in 2008**

- a) **Welcome to the Planet (20 January, 2008)**
- b) **Looking back at 2007, and looking ahead (10 February, 2008)**
- c) **The integrity of science: the IPCC process (2 March, 2008)**
- d) **The challenge we all face (23 March, 2008)**
- e) **Spring, carbon dioxide and the rebirth of life (13 April, 2008)**
- f) **The Spring climate transition (11 May, 2008)**
- g) **The mid-summer solar moon (8 June, 2008)**
- h) **The interdependence of water and life (6 July, 2008)**
- i) **Facing the truth about our policies (3 August, 2008)**
- j) **From the European Weather Centre (31 August, 2008)**
- k) **Caring for our forests (5 October, 2008)**
- l) **Sustainable Systems (9 November, 2008)**
- m) **Our common Planet (14 December, 2008)**

Link Local Weather and Climate

The Transition into Fall. (September 13, 2009)

Snow's Global Impact. (March 1, 2009)

Lilacs grow green earlier and winter shrinks (July 4, 2010)

Spring climate transition and new beginnings (April 25, 2010)

**Climate change affects fall and winter transitions in Vermont
(Nov. 7, 2010)**

What to do with all this rain! (Nov. 21, 2010)

Winter reflections on more signs of climate change (Feb 13, 2011)

Floods and more floods get our attention (June 19, 2011)

Discuss Earth System and Policy Issues

The interdependence of water and life (6 July, 2008)
Facing the truth about our policies (3 August, 2008)

Envisioning a sustainable energy future. (April 5, 2009)
Balancing technology, economics and values. (May 10, 2009)

Earth science and society (January 31, 2010)
Winter waste management (March 7, 2010)

Let's be honest about our global interdependence (April 3, 2011)
Real power lies in resilience, not risk (May 8, 2011)

Explaining Climate Processes to the Public

- Using the
 “Seasonal Climate Transitions”
 - *Spring, Summer, Autumn and Winter*
 - *Familiar to farmers, gardeners and foresters (but not always understood)*
- Betts, A. K. (2011), Seasonal Climate Transitions in New England. *Weather*, 66 (in press). DOI: 10.1002/wea.754.
 <http://alanbetts.com/research>

Two Spring Transitions

- 1) Warm dry week to ten days in Spring, after snowmelt, past the equinox
- 2) Followed by drop of temperature of 5F with leaf-out – in a wave up the eastern seaboard

Many key climate processes:

- Seasonal lags-melt of frozen soils
- Vegetation-evaporation coupling
- Latent heat of evaporation reduces surface T
- Evaporation-RH-cloud-vapor greenhouse
- RH- LW_{net} - diurnal temperature range - frost

Spring Transition-1

4/15/2008

- *Weather:*

Sunny, dry week

- *Climate:*

After snowmelt before
leaf-out 'warm & dry'
(little evaporation).
Large diurnal temp.
range.

Frost likely.

- *Climate change:*

'Spring' earlier than
30 years ago



Pittsford, Vermont

Spring Transition-2

5/15/2010

- *Weather:*

Cooler, humid, cloudy week

- *Climate:*

After leaf-out, large evaporation, temp. falls 3°C. Low cloud-base. Smaller diurnal temp. range.

Frost unlikely.

- *Climate change:*

‘Leaf-out’ earlier than 30 years ago

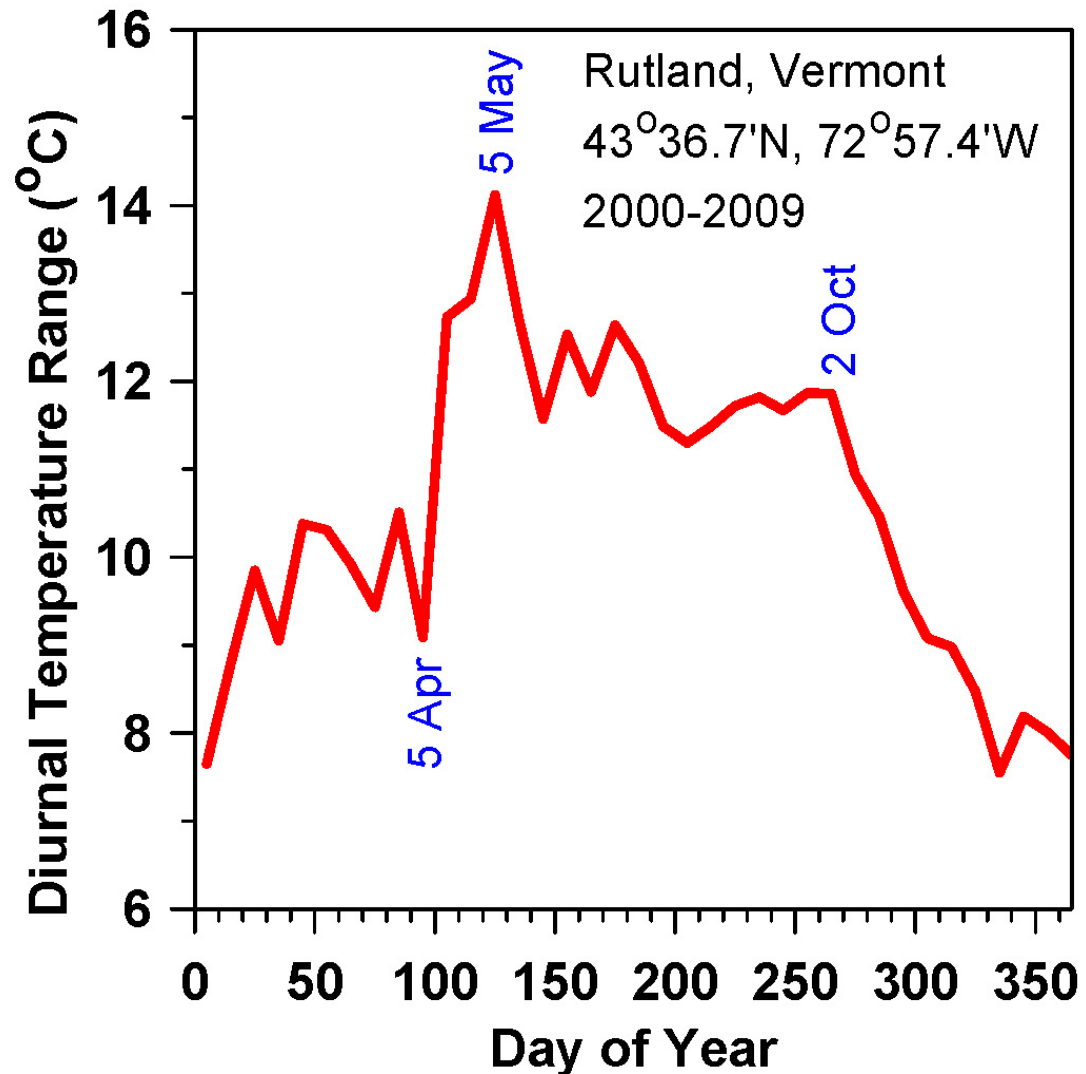


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Mean Diurnal Temperature Range

- **Water vapor & cloud greenhouse effect linked to diurnal range of temperature**
- **Coupled to transpiration**

[Betts, Weather 2011]



Summer Transitions

- **Summer dry-down; soil moisture falls, evaporation falls, boundary layer drier, less precipitation**
- **May lock into a dry spell, a 'drought' until upset by a strong weather system**
- ***But it can go either way...***
- **2008 and 2009, Vermont had wet summers with evaporation-precipitation feedback**
- **2010 we had a summer dry-down**
- **2011 is starting very wet... flooding**

Wet Summers



- Both 2008 and 2009 were wet
- Direct fast evaporation off wet canopies
- Positive evaporation-precipitation feedback

Summer Dry-down

- Wet in spring
- Soil moisture falls: dry-down
- Low humidity & no rain
- Hay dries fast!



Fall Colors

- **Fall color after killing frost**
- **If delayed then less color as leaves die slowly**
- **Note blue sky – dry atmosphere**
- **First frost in VT getting later**



Winter Transition: T Falls Sharply

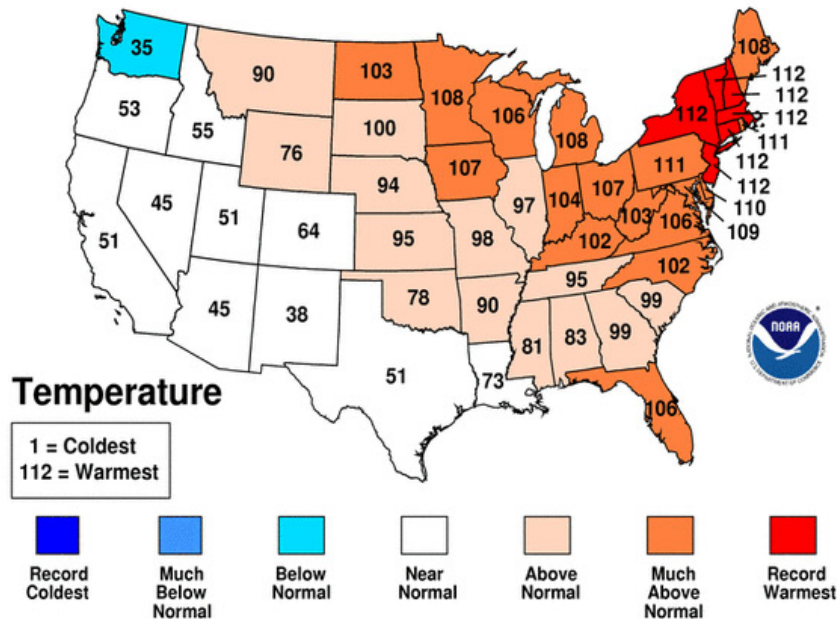
- Snow reflects sunlight
- Sublimation low
- Dry atmosphere
- *Reduced water vapor greenhouse*
 - *cools to space*
- Snow uncouples ground
- Temperature falls
- *2011 a lot of snow – colder temperatures*



Warmest December on Record: Transition delayed into mid-January

Statewide Ranks December 2006

National Climatic Data Center/NESDIS/NOAA



Gardening in Pittsford, VT
Jan 7, 2007

Conclusions

- *How can we help communities deal with climate change mitigation and adaptation?*
- Discuss relation of weather & climate, policy, energy & Earth system issues in the media — and provide web resources
- Explain key climate processes using the seasonal climate transitions that can be grasped in terms of personal experience