

Canada / US GEO Testbeds and Drought Studies:

Drought Indices & Definitions Study

and

SWSI (Surface Water Supply Index) Study

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National Climatic Data Center



Drought Indices & Definitions Study

✓ Objective:

- Improve the definition of drought for the different climatic regions of North America
- Assess existing drought indices to determine the appropriateness of the indices for the various climatic regions of North America

✓ Climate Regions:

- Arid – Rockies, Southwest U.S., interior Western U.S.
- Semiarid – Rockies, western Prairies, western Great Plains
- Subhumid – eastern Prairies, eastern Great Plains
- Humid – Great Lakes, eastern U.S., Canadian Maritimes
- Sub-arctic – high elevation Rockies, northern Canada
- Arctic – northern Canada, Alaska

Linkages to testbed studies:

Great Lakes testbed – hydrological indices

Rockies testbed – hydrological indices

Prairies testbed – agricultural indices



Drought Indices & Definitions Study

✓ Goals & Deliverables:

- **Produce an inventory of primary drought indices to determine which indices are appropriate to define drought in each of the climatic regions, including consideration of seasonality, timescale of the indices, and related impacts**
- **Produce a literature review/bibliography of drought index studies relevant to the diverse climates of North America**
- Include an assessment and recommendation for development of regional drought indices (such as the VegDRI and SWSI) that can be applied on a continental scale
- Determine if new drought indices may be needed to measure and monitor drought as the climate changes



Drought Indices & Definitions Study

✓ Benefit / Value:

- Enable authors of the Canadian Drought Monitor (CanDM), USDM, and NADM to better depict drought in the various climate regions of North America, especially the arid, arctic, and sub-arctic areas

✓ Outcome:

- Improved Canada, US, North America Drought Monitor depictions
- Improved decision support for those sectors affected by drought, especially agriculture and water managers and planners
- Refined identification of characteristics of drought in the various climatic regions of North America
- Support WMO efforts to establish a global drought monitoring effort

✓ 92 U.S./Canadian participants involved

✓ Co-Leads: Allan Howard/Trevor Hadwen (Canada), Richard Heim (U.S.)



Drought Indices & Definitions Study

✓ GEO Drought Indices community set up on NIDIS drought portal

drought.gov

Welcome, Richard Heim

Administration | My Account | Help | Log Off

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GEO Drought Indices Home

GEO Drought Indices Home | Unsubscribe from this community

Create Page | Edit Page

Community Projects

Project Name	Status
GEO Drought Indices	0%

Community Documents

Name	Project	Date Modified	Checked In By
II-America-Drought-Indices-USCNGeo.xls	GEO Drought Indices	3/9/10 8:49 AM	Edwin Munic
participants_CGEO-USGEO_Drought-Definitions-Indicators	GEO Drought Indices	10/15/09 2:38 PM	Richard Heim
updated participants_CGEO-USGEO_Drought-Definitions-Indicators	GEO Drought Indices	8/24/09 4:11 PM	Richard Heim
Instructions for Using Collaboration Areas in the US Drought Portal.pdf	GEO Drought Indices	8/20/09 7:42 AM	Jason Symonds

Community Announcements

Subject: GEO Drought Indices Community Introductory Email
From: Richard Heim <Richard.Heim@noaa.gov>
Date: Thu, 27 Aug 2009 15:00:53 -0400
To: (participant list)

Dear drought colleagues,

Welcome to the GEO Drought Indices Community! This community has been set up on the NIDIS drought portal to serve as a communications medium for the U.S.-Canadian GEO bilateral Drought Definitions and Indices study. In the paragraphs below, I will be discussing some introductory information regarding how to log in to the community, some features available, and what we hope to accomplish.

The NIDIS drought portal is located at:
<http://www.drought.gov/>
To access the GEO Drought Indices Community, at that website click on the "Log In" link at the upper right. Enter your User Name and Password supplied by Jason Symonds. The GEO Drought Indices community should be located under the "My Communities" tab.

Posted by Richard Heim on 8/27/09 3:06:00 PM in project GEO Drought Indices

There are currently 3 documents located under the "Community Documents" portfolio:

- 1) Instructions for Using Collaboration Areas in the US Drought Portal.pdf
This document, written by NIDIS portal experts, describes how to use community areas (collaboration areas) on the NIDIS drought portal, including how to check out and check in (download and upload) documents, post community announcements and discussions, and update the calendar.
- 2) updated participants_CGEO-USGEO_Drought-Definitions-Indicators-kickoff-discussion-RH090824.doc
This document contains background information on the Drought Definitions and Indices study and the latest participant list. I'll be updating/replacing this document periodically.
- 3) II-America-Drought-Indices-USCNGeo.xls
This spreadsheet is the primary tool we'll be using to compile the list of drought indices used to monitor and assess drought across the North American continent. I've started the list by filling in the Palmer indices to illustrate the information we are looking for.

Posted by Richard Heim on 8/27/09 2:05:39 PM in project GEO Drought Indices

The II-America-Drought-Indices-USCNGeo.xls document should be checked out and edited by the participants of this study. In order to ensure that this is done in an orderly way so no information is lost, you are asked to add your information for new indices and edit information for indices already listed and to accomplish this task within a couple hours, then check in.



SWSI Study

✓ **Surface Water Supply Index (SWSI):**

- Drought index unique to western U.S.
- Incorporates
 - Precipitation
 - Streamflow
 - Mountain snowpack
 - Reservoir storage

✓ **Objective :**

- Compute equivalent to SWSI for western Canada
- Perhaps NIDIS could provide service by providing tools on web for local entities to put together their own SWSI indices



Proposed EC/NOAA Cooperative Projects

✓ **Description:**

- The drought community serves as a role model for climate services, including data sharing, applications development and collaboration on multiple scales and across disciplinary and political borders.
- This proposal builds upon these strengths to serve decision-maker needs at multiple scales that cross the U.S. Canadian border.
- Includes activities to promote cooperation in sharing observations, analyses, transitioning research results to operations.
- Two-year time frame.

✓ **Expected Results:**

- Drought services in North America would be improved and a way forward for other climate services identified.



Proposed EC/NOAA Cooperative Projects

✓ Proposed Tasks:

1. GHCN cooperation in analysis methods: comparison of reference networks.
2. Standardized Precipitation Index: Recommendations will be made on base period, time scales, and frequency distribution. NOAA and EC share analyses and hold session at workshop, if possible. (Follow-up to April Global Drought Assessment Workshop—GDAW)
3. Prairie Region: In cooperation with USGEO and CGEO, critical gaps will be closed in the critical Earth observation requirement for agriculture for soil moisture.
4. Studies of drought in the context of hazards and extreme events: In cooperation with USGEO and CGEO and under the USGEO/CGEO Bi-lateral the following subtasks are proposed:
 - a. Drought Indices & Definitions Study
 - b. SWSI Study



Proposed EC/NOAA Cooperative Projects

✓ Proposed Tasks (cont):

5. Regular inventory of effectiveness of station data exchange and development of process to monitor and assure timely provision of quality station data.
6. Production of the North American Drought Monitor (NADM): Accelerate the deadlines and timelines for receipt of Canadian, Mexican, and U.S. daily data to the third of the month.
7. NIDIS drought portal web services: develop services to support NADM drought monitoring and production.
8. Incorporation of NADM into a Global Drought Early Warning System (GDEWS) and associated Clearinghouse for international drought information – identify options. (Follow-up to April GDAW)
9. Operationalize & integrate North America Climate Extremes Monitoring (NACEM) capability into drought service – because drought can be partially described in the context of climate extremes.



Other Potential Cooperative Projects

✓ Discussed at the April GDAW:

1. North American Drought Outlook
2. North American Drought Impacts Reporter
3. VegDRI for North America
 - a. Hybrid Drought Index that incorporates:

1. Historical Database Development

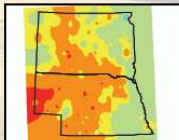
U S G S E R O S Satellite Data



Data Input Variables

- 1) Percent Annual Seasonal Greenness (PASG)
- 2) Start of Season Anomaly (SOSA)

A C I S Climate Data

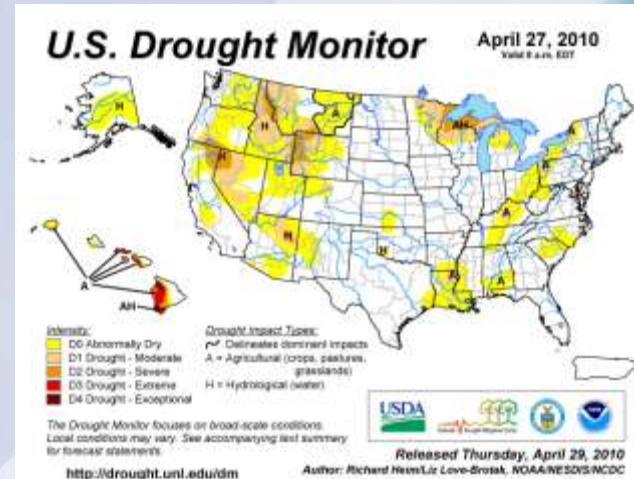


- 1) Palmer Drought Severity Index (PDSI)
- 2) Standardized Precip. Index (SPI)

Biophysical Data



- 1) land use/ cover type
- 2) soil available water capacity (STATSGO)
- 3) ecoregion type
- 4) irrigation status
- 5) elevation



Vegetation Drought Response Index Complete

May 3, 2010

