

CU Proposal No.: 0911.75.1571B

A Subcontract Proposal to the
Colorado Water Conservation Board
for Support of
**Continuation of: Seasonal climate forecasts
for Colorado**

Name and Address of Institution:

The Regents of the
University of Colorado
572 UCB
Boulder, CO 80309-0572
Telephone: (303) 492-6221
FAX: (303) 492-6421

Institutional Identifiers:

DUNS: 00-743-1505
Cage Code: 4B475
TIN: 84-6000555

Desired Starting Date:

November 1, 2011

Proposed Duration:

5 months

Amount Requested:

\$6,840

Principal Investigator:

Klaus Wolter
Research Associate
Cooperative Institute for Research
in Environmental Sciences
University of Colorado
216 UCB
Boulder, CO 80309-0216
Telephone: 303 497-6340
Fax: 303 492-1149
Klaus.Wolter@noaa.gov


Lisa Tedesco, Proposal Analyst
Office of Contracts and Grants


Klaus Wolter
Principal Investigator

Seasonal climate forecasts for Colorado

Project Duration: November 2011 - March 2012

PI: Klaus Wolter, CIRES at University of Colorado, Boulder, CO

Scope of Work

In response to the need of CWCB to provide for a long-lead outlook of weather/ climate conditions at its Water Availability Task Force (WATF) meetings, the following describes the work proposed that builds on a decade of forecast experience:

- (1) *Compute seasonal precipitation forecasts* for Southwestern U.S., including Colorado, for cardinal Water year seasons at appropriate lead-times (up to four months out). This task consists of:

- (1a) The timely update of input (predictor) information from a variety of sources, including in-house computations, their transfer into a statistical package that is used to manage this data, and the calculation of actual forecast values in spreadsheets that use the existing statistical regression schemes for up to ten output (predictand) regions and six separate base periods in a given forecast season;

Labor: 1.0 days per forecast times THREE for forecasts made in November 2011, and January and March 2012 (*Total Cost: \$1,595 for 3.0 days*)

- (1b) The post-processing (transformation) of all forecast values (from Task 1a) into forecast tilts towards wet (dry, near-normal) conditions, the creation of forecast display maps, and an ongoing assessment of skill (based on verification seasons since 2000).

Labor: 0.5 days per forecast times THREE for forecasts made in November 2011, and January and March 2012 (*Total Cost: \$797 for 1.5 days*)

- (2) *Prepare and present talks at WATF meetings* (plus one talk at CWCB board meeting in March). This task consists of:

- (2a) The preparation of all relevant information on the current and expected El Niño/Southern Oscillation (ENSO) situation, appropriate Climate Prediction Center (CPC) and own seasonal and shorter-range forecasts, verification of recent seasonal precipitation anomalies against seasonal forecast(s) and typical ENSO impacts into powerpoint presentations;

Labor: 1.25 days per forecast times THREE for presentations in November 2011, and January and March 2012 (*Total Cost: \$1,993 for 3.75 days*)

- (2b) Presentation of powerpoint (Task 2a) and participation in WATF (and one CWCB board) meetings, including the creation and handout of 'Executive Summary' one-pagers, and availability for follow-up questions.

Labor: 0.4 days per forecast times FOUR for presentations in November 2011, and January and March 2012 (twice) (*Total Cost: \$851 for 1.6 days + \$118 for travel and materials*)

- (3) Prepare and present talk to Flood Task Force meeting in March. This task consists of:

(3a) Ingest of pertinent information on dust loads and preparation of medium-to long-range forecast information to weight medium- to long-range risk of flooding in association with snowmelt;

Labor: 0.5 days per forecast for presentation in March (*Total Cost: \$266 for 0.5 days*)

(3b) Presentation of flooding risk info integrated into WATF powerpoint.

Labor: 0.15 days per forecast for presentation in March (*Total Cost: \$80 for 0.15 days*)

Total Labor: 10.5 days during November through March 2012 (Total Cost before 20% overhead is added on: \$5700, ending up as \$6840; this includes costs for IT support, transportation, and materials).

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PROPOSED BUDGET DETAILS

Institution: The Regents of the
University of Colorado
572 UCB
Boulder, CO 80309-0572

Title: Continuation of: Seasonal
climate forecasts for Colorado

Principal Investigator: Klaus Wolter

Duration: 11/1/11 - 10/31/12

A. Salaries and Wages

Amount Requested

Principal Investigator: K. Wolter

10.5 person days

3,463

IT Support: TBN

5% time, 3 months

795

Total Salaries and Wages

4,258

B. Fringe Benefits

PI/Other: 31.1% of salary

1,324

Total S/W and Fringe Benefits

5,582

C. Travel

Domestic

PI mileage to attend regional
project meetings.

\$.50/mile x 200 miles

100

Total Travel

100

D. Other Direct Costs

1. Materials and Supplies:

18

Total Other Costs

18

E. Total Direct Costs

5,700

F. Indirect Costs

Off Campus Research:

20% of TDC per agency guidelines.

1,140

G. Total Costs

6,840

ABBREVIATED CURRICULUM VITAE

Klaus Wolter

September 2011

ADDRESS: Cooperative Institute for Research in Environmental Sciences
University of Colorado/NOAA Earth System Research Laboratory
Physical Sciences Division
325 Broadway R/PSD1
Boulder, CO 80305

Phone/Fax/e-mail: (303) 497-6340 / -6449 / klaus.wolter@noaa.gov

PERSONAL: German Citizen / Permanent U.S. Resident

EDUCATION: 1987 Ph.D., Department of Meteorology, University of Wisconsin -
Madison; Dissertation: *Modes of surface circulation and climate over
the tropical Atlantic, Eastern Pacific, and Indian Oceans.*

1981 "Diplom" (equivalent of M.Sc.), Department of Meteorology,
University of Hannover, Germany; Translated thesis title: "*Dust
transports over North Africa and the adjacent Atlantic*".

EXPERIENCE: 1988 -now CIRES Research Associate, University of Colorado - Boulder
(post-UW Madison)

1987 - 88 UCAR Visiting Postdoctoral Scientist, Climate Analysis Center,
National Meteorological Center, Washington, DC

RECENT REFEREED PUBLICATIONS

- Wolter, K.**, and M.S. Timlin, 2011: El Niño/Southern Oscillation behaviour since 1871 as diagnosed in an extended multivariate ENSO index (MEI.ext). *International J. of Climatology*, **31**, 1074-87.
Downloadable at: <http://onlinelibrary.wiley.com/doi/10.1002/joc.2336/abstract>
- Ray, A.J., J.J. Barsugli, K.B. Averyt, **K. Wolter**, M. Hoerling, N. Doesken, B. Udall, and R.S. Webb, 2008: Climate Change in Colorado – A synthesis to support water resources management and adaptation. Report by the Western Water Assessment for the Colorado Water Conservation Board, Boulder, 58pp. Downloadable at: http://cwcb.state.co.us/NR/rdonlyres/B37476F5-BE76-4E99-AB01-6D37E352D09E/0/ClimateChange_FULL_Web.pdf
- Pielke, R.A. Sr., **K. Wolter**, O. Bliss, N. Doesken, and B. McNoldy, 2007: The July 2005 Denver heat wave: How unusual was it? *National Weather Digest*, **31**, 24-35.
Downloadable at: <http://www.climatesci.org/publications/pdf/R-313.pdf>
- Chase, T.N., **K. Wolter**, R.A. Pielke Sr., and Ichtiague Rasool, 2006: Was the 2003 European summer heat wave unusual in a global context? *Geophys. Res. Lett.*, **33**, L23709, doi:10.1029/2006GL027470.
Downloadable at: <http://www.climatesci.org/publications/pdf/R-310.pdf>
- Pielke, R.A., Sr., N. Doesken, O. Bliss, T. Green, C. Chaffin, J.D. Salas, C.A. Woodhouse, J.J. Lukas, and **K. Wolter**, 2005: Drought 2002 in Colorado: An Unprecedented Drought or a Routine Drought? *Pure Appl. Geophys.*, **162**, 1455-1479.
Downloadable at: <http://www.climatesci.org/publications/pdf/R-285.pdf>
- Wolter, K.**, S.J. Lubker, and S.D. Woodruff, 2003: Quality control in recent and pending COADS releases. *Advances in the Applications of Marine Climatology – The Dynamic Part of the WMO Guide to the Applications of Marine Climatology*, WMO/TD-No. **1081** (JCOMM Technical Report No. 13), 116-123. [whole WMO Report at: http://icoads.noaa.gov/jcomm_tr13.pdf]
- Brown, T.J., A. Barnston, J.O. Roads, R. Martin, and **K. Wolter**, 2003: 2003 Seasonal Consensus Climate Forecasts for Wildland Fire Management. *Experimental Long-Lead Forecast Bulletin*, **12**, 31-36.

ABBREVIATED CURRICULUM VITAE

Klaus Wolter

September 2011

SELECTED EARLIER PUBLICATIONS

- Wolter, K.**, R.M. Dole, and C.A. Smith, 1999: Short-term climate extremes over the continental U.S. and ENSO. Part I: Seasonal temperatures. *J. Climate*, **12**, 3255-3272.
- Wolter, K.**, and M.S. Timlin, 1998: Measuring the strength of ENSO events - how does 1997/98 rank? *Weather*, **53**, 315-324.
- Wolter, K.**, 1997: Trimming problems and remedies in COADS. *J. Climate*, **10**, 1980-1997.
- Hastenrath, S., and **K. Wolter**, 1992: Large-scale patterns and long-term trends of circulation variability associated with Sahel rainfall anomalies. *J. Meteor. Soc. Japan*, **70**, 1045-1055.
- Wolter, K.**, 1989: Modes of tropical circulation, Southern Oscillation, and Sahel rainfall anomalies. *J. Climate*, **2**, 149-172.
- Wolter, K.**, 1987: The Southern Oscillation in surface circulation and climate over the Atlantic, Eastern Pacific, and Indian Oceans, as captured by cluster analysis. *J. Climate Appl. Meteor.*, **26**, 540-558.

PRIMARY RESEARCH INTERESTS

My main research interests lie in empirical climate research, in particular the application of statistical methods to climate problems, such as the impact of ENSO (El Niño/Southern Oscillation) on world-wide climate. I have developed and refined a "Multivariate ENSO Index" (MEI) based on tropical Pacific ship-based observations of sea level pressure, near-surface wind fields, sea – and air surface temperatures, as well as total cloudiness. The MEI is more robust than conventional indices in monitoring the ENSO phenomenon, and recently been extended back to the 19th century. Monthly updates and discussions of the MEI as well as relevant publications can be found under <http://www.esrl.noaa.gov/psd/enso/mei/>

In the last decade, I have been able to devote more attention to the analysis and prediction of U.S. climate, being involved in the Western Water Assessment (WWA) project at CU and, more recently NIDIS (National Integrated Drought Information System). In this context, I have developed statistical tools that allow me to make seasonal climate predictions, such as 'SWcasts' for the interior southwestern U.S.: <http://www.esrl.noaa.gov/psd/people/klaus.wolter/SWcasts/>

Under the WWA umbrella, I have also engaged in climate studies with the Colorado State Climatologist, focusing on assessments of drought and temperature trends in Colorado – our findings on this topic are summarized in a 2008 report to the Governor at: <http://cwcb.state.co.us/public-information/publications/Documents/ReportsStudies/ClimateChangeReportFull.pdf>

I am also part of the 'Climate Scene Investigation' team here at the NOAA-ESRL Physical Science Division (<http://www.esrl.noaa.gov/psd/csi/>) that attempts to sort out how much if any of recent climate and weather extremes can be attributed to anthropogenic forcing.