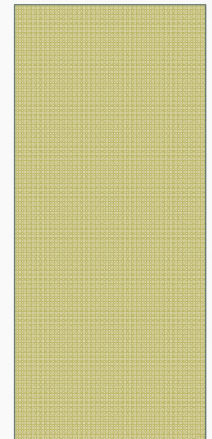


CPC VERIFICATION WEB TOOL (VWT)

Melissa Ou, Mike Charles, Sarah Marquardt
(NWS Sullivan, WI), Jon Gottschalck, Scott
Handel, Adam Allgood



OVERVIEW

- About the VWT
- Potential Applications
- How to run/use the VWT
- Features

GOAL

Enable users to perform customized verification on many CPC official forecasts and tools (web application).

ABOUT THE VERIFICATION WEB TOOL (VWT)

- Can be viewed on any OS
- Allows users to aggregate temporally and spatially for official forecasts and tools of different timescales
- Charts and maps available
- Results calculated on the fly
- Java, JavaScript, MySQL

POTENTIAL APPLICATIONS

- Research and operations
- Internal and external (to CPC) users
- Added value to forecasts for decision support

CPC Verification Summary


[Click here](#) to access the interactive Verification Web Tool 

Chart **Map** Tutorial

Overview

This is a summary verification page of CPC's official outlooks. Verification indicates the skill of outlooks, which is a relative measure of how the outlooks performed. Knowledge of the skill of the outlooks can help users for decision making purposes.

Instructions for Use:

1. Select type of skill score output desired ("Chart" or "Map") from the tabs above
2. Select options in the panel to the right
3. Click on the "Get scores" button

[Click here for more information](#)

Options


Field [?]

Period [?]

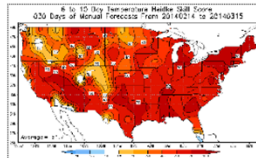
Skill Score [?]

[Interactive Verification Web Tool](#)

Results

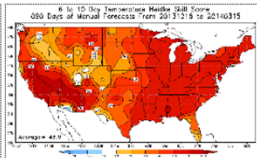
Tip: Click images below to see them full size 

LAST 30 DAYS



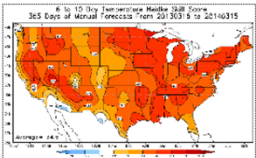
[Download data](#)

LAST 90 DAYS



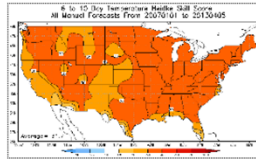
[Download data](#)

LAST 365 DAYS



[Download data](#)

ALL SEASONS



[Download data](#)

Warnings and Errors

Information

Understanding the skill score

The Heidke Skill Score (HSS) compares how often the forecast category correctly match the observed category, over and above the number of correct "hits" expected by chance alone.

This score utilizes the number of correct and incorrect category hits. The values range from -50 to 100. A score of 100 indicates a perfect forecast and a score of -50 indicates a perfectly incorrect forecast. Scores greater than 0 indicate improvement compared to a random forecast and indicate skill.

For monthly and seasonal forecasts, the equal chances (EC) forecast category are included in scores.

The equation for the score is:

$$HSS (\%) = 100 * (H - E) / (T - E)$$

where H = Number of correct forecasts, E = Expected number of correct forecasts (1/3 of total), and T = Total number of valid forecast-observation pairs.

The equation for the score including EC forecasts is:

$$HSS_{withEC} (\%) = HSS * coverage$$

where coverage = number of non EC forecasts/Total.

Summary Page

CPC Home Page left panel:
Under 'Outlooks' ->
'Verification'

- Contains subset of pre-generated graphics
- Can access VWT from summary page

ACCESSING THE VWT

- In browser: vwt.ncep.noaa.gov
- Mac OS – Safari or Firefox
- Must have Java Run-Time installed

1

2



CPC Verification Web Tool (VWT)

This is an interactive tool that allows users to calculate the skill of forecasts, which is a relative measure of how the forecasts performed. Knowledge of forecast skill can help users when using forecasts for decision making.

Instructions for use:

1. Select type of skill score output display desired ("Chart" or "Map").
2. Select Forecast and Verification Options.
3. For "Chart", select region(s) to verify ("Climate Regions", "States", "Climate Divisions"). For "Map", select date(s) to verify ("Date Range", "Months/Seasons & Years", "Climate Phenomena").
4. Click the "Get Scores" button.

[Click here for more information](#)

Chart Map Tutorial

Scroll down the page to see the results, error messages, and information panel.

Field
Forecast field to calculate skill score for:

Field [?] temperature
 Period [?] 6-10 Day Period
 Lead time [?] 8 days
 Data format [?] station
 Forecast(s) (Select up to 4) [?]
 CPC Official (Manual)
 CPC Official (Auto)
[Select forecast model](#)


Verification options

Start date [?] 20120101
 End date [?] 20120401
 Region(s) [?] MW,NE,SE,S
 Skill Score [?] heldke
 Forecast categories [?] include all

Get scores **Finished, please scroll down**

2 Select region(s) to verify

To unselect, you must clear all regions by clicking "Revert to all regions". All regions are verified by default.



Revert to all regions

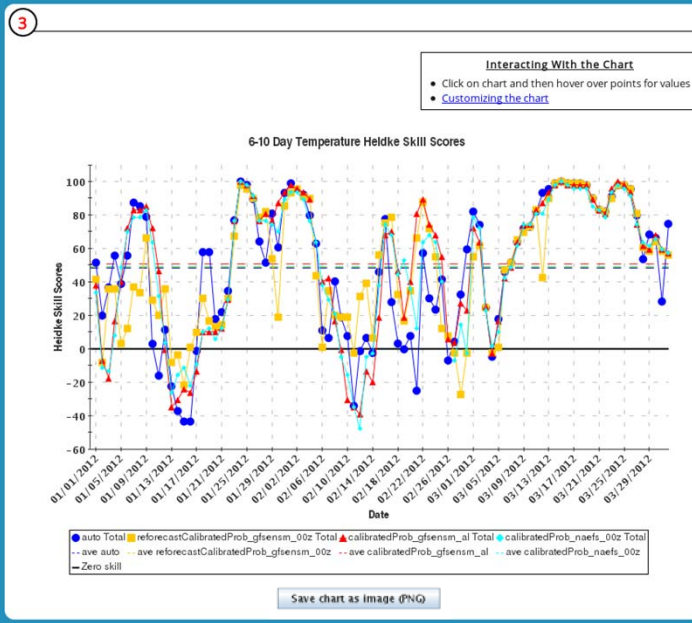


Chart Example

Instructions for use:

1. Select type of skill score output display desired ("Chart" or "Map").
2. Select Forecast and Verification Options.

Tool Selector

	KleinCat	KleinProb	analog	calibratedProb	reforecastCalibratedProb	uncalibratedProb
gfs_00z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
gfs_06z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
gfsensm_00z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
gfsensm_06z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
gfsensm_al	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
canm_00z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ecm_00z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ecmensm_00z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
manual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
auto	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
naefs_00z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
naefs_06z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clear all 1 out of 4 forecast sources are checked

Ok

- Timeseries, Reliability Diagrams
- Save chart graphic
- Click and hover for point values
- Customizable chart

JClass Chart Properties

File Look & Feel

Chart Data View Axes Chart Area Legend Titles

Axes: X0(Default X) Y0(Default Y)

General Annotation Scale Title Labels Grid

View Axis Relationship Axis Placement

Visible
 Editable
 Logarithmic
 Reversed
 Vertical

X View
 Y View

Data View: 1:

Add Remove

CPC Verification Web Tool (VWT)

Before you can use the tool, 1 or 2 Java-related windows will popup. For the 1st window, check the box and click "Run". If there's a 2nd window, click "Allow" or "Don't Block". Note that sometimes the popup window is hidden behind the browser.

This is an interactive tool that allows users to calculate the skill of forecasts, which is a relative measure of how the forecasts performed. Knowledge of forecast skill can help users when using forecasts for decision making.

Instructions for use:

1. Select type of skill score output display desired ("Chart" or "Map").
2. Select Forecast and Verification Options.
3. For "Chart", select region(s) to verify ("Climate Regions", "States", "Climate Divisions"). For "Map", select date(s) to verify ("Date Range", "Months/Seasons & Years", "Climate Phenomena").
4. Click the "Get Scores" button.

[Click here for more information](#)

Chart | **Map** | Tutorial

Scroll down the page to see the results, error messages, and information panel.

1 Options

Forecast options

Field [?]

Period [?]

Lead time [?]

Data format [?]

Forecast(s) (Select one) [?]

CPC Official (Manual)

CPC Official (Auto)

[Select forecast models](#)

Verification options

Skill Score [?]

Get scores Finished, please scroll down

2 Valid Dates

Date range OR Months/Seasons & Years OR Climate Phenomena

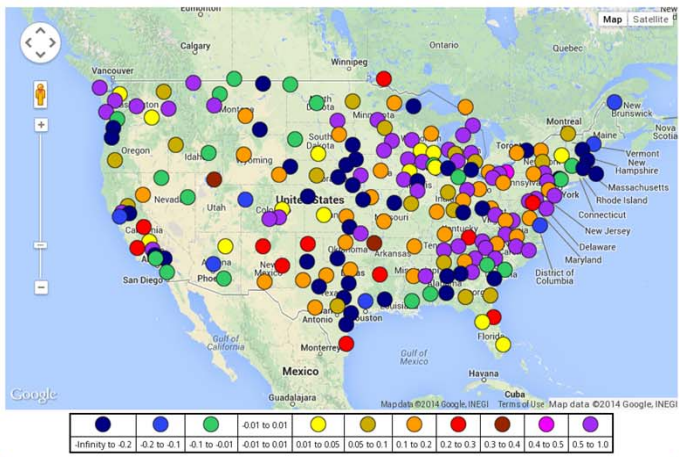
Dates represent the center of the valid period of the forecast(s) to verify.

- Start date [?]
- End date [?]

3 -14 Day Temperature Ranked Probability Skill Scores for calibratedProb_gfsensm_al from 20120601-20130601

Interacting With the Map

- Click on any colored circle for the position of that point and the score



Map Example

4 Warnings and Errors

5 Information

Summary of results

The average heidke score(s) for including all categories for the :

- auto forecast is **48.29** with 91 values
- reforecastCalibratedProb_gfsensm_00z forecast is **48.89** with 92 values
- calibratedProb_gfsensm_al forecast is **50.6** with 91 values
- calibratedProb_naefs_00z forecast is **49.37** with 91 values

The highest heidke score(s) for including all categories for the :

- auto forecast is **100.0** on 01/24/2012, 03/15/2012
- reforecastCalibratedProb_gfsensm_00z forecast is **100.0** on 03/15/2012
- calibratedProb_gfsensm_al forecast is **100.0** on 01/24/2012, 03/15/2012, 03/24/2012
- calibratedProb_naefs_00z forecast is **100.0** on 01/24/2012, 03/15/2012

The lowest heidke score(s) for including all categories for the :

- auto forecast is **-43.66** on 01/15/2012, 01/16/2012
- reforecastCalibratedProb_gfsensm_00z forecast is **-27.44** on 02/28/2012
- calibratedProb_gfsensm_al forecast is **-39.29** on 02/12/2012
- calibratedProb_naefs_00z forecast is **-47.86** on 02/12/2012

Interpreting the X and Y Axes

The dates on the x-axis are the centered dates of the forecast valid period.

The y-axis indicates the skill score value of the score selected.

Understanding the skill score

The Heidke Skill Score (HSS) compares how often the forecast category correctly match the observed category, over and above the number of correct "hits" expected by chance alone.

This score utilizes the number of correct and incorrect category hits. The values range from -50 to 100. A score of 100 indicates a perfect forecast and a score of -50 indicates a perfectly incorrect forecast. Scores greater than 0 indicate improvement compared to a random forecast and indicate skill.

For monthly and seasonal forecasts, the equal chances (EC) forecast category are included in scores.

The equation for the score is:

$$HSS (\%) = 100 * (H - E) / (T - E)$$

where H = Number of correct forecasts, E = Expected number of correct forecasts (1/3 of total), and T = Total number of valid forecast-observation pairs.

The equation for the score including EC forecasts is:

$$HSS_{withEC} (\%) = HSS * coverage$$

where coverage = number of non EC forecasts/Total.

Settings Used (copy these settings into the survey when describing a problem)

variable=temp, fcstSource=auto, reforecastCalibratedProb_gfsensm_00z, calibratedProb_gfsensm_al, calibratedProb_naefs_00z, leadTime=08d, aveWindow=05d, datesValidType=dateRange, datesValid=20120101,20120401, regionType=climateRegion, regions=MW,NE,SE,S, spatialType=station, outputType=chart, outputDimension=time, scoreType=heidke, categoryType=total, ECType=default

CPC Verification Web Tool (VWT)

This is an interactive tool that allows users to calculate the skill of forecasts, which is a relative measure of how the forecasts performed. Knowledge of forecast skill can help users when using forecasts for decision making.

Instructions for use:

1. Select type of skill score output display desired ("Chart" or "Map").
2. Select Forecast and Verification Options.
3. For "Chart", select region(s) to verify ("Climate Regions", "States", "Climate Divisions"). For "Map", select date(s) to verify ("Date Range", "Months/Seasons & Years", "Climate Phenomena").
4. Click the "Get Scores" button.

[Click here for more information](#)

Chart **Map** Tutorial

Scroll down the page to see the results, error messages, and information panel.

1 Options

Forecast options

Field [?]

Period [?]

Lead time [?]

Data format [?]

Forecast(s) (Select one) [?]

CPC Official (Manual)

Forecast Models

SMLR

CCA CFS

OCN CON

Verification options

Skill Score [?]

Forecast categories [?]

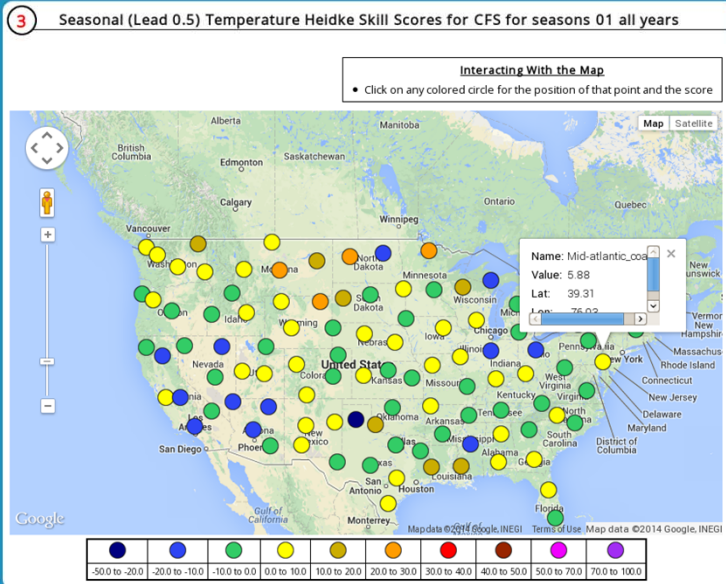
Finished, please scroll down

2 Valid Dates

You can select multiple months/seasons for either all years or select years. Your "Forecast" selection will show either "Months" or "Seasons" as options.

- Select months: Click on each, unselect by clicking again.
- Select years: Hold down the Command button while making selections (Ctrl on Windows/Linux, Apple on Mac OS X).
- Range of years: Hold down the Shift button and select the first and last years.

Months				Years	
<input type="checkbox"/> Dec-Feb	<input type="checkbox"/> Jan-Mar	<input type="checkbox"/> Feb-Apr	<input type="checkbox"/> Mar-May	<input checked="" type="radio"/> All years	<input type="text" value="1995"/>
<input type="checkbox"/> Apr-Jun	<input type="checkbox"/> May-Jul	<input type="checkbox"/> Jun-Aug	<input type="checkbox"/> Jul-Sep	<input type="radio"/> Select years	<input type="text" value="1996"/>
<input type="checkbox"/> Aug-Oct	<input type="checkbox"/> Sep-Nov	<input type="checkbox"/> Oct-Dec	<input type="checkbox"/> Nov-Jan		



Map Example Aggregation by seasons

- Click on points for values/info

ACCESSING THE VWT

- Web tool: vwt.ncep.noaa.gov
- 'Static' summary page:
<http://www.cpc.ncep.noaa.gov/products/verification/summary/>
- Can navigate to page by going to '**Verification**' link under 'Outlooks' on CPC home page

DEMO-FEATURES

- Chart Tab: Timeseries, reliability diagrams
 - Aggregate spatially
 - Save image
 - Chart customization
 - Click and hover for point values
- Map: Verification Map
 - Aggregate temporally
 - Click on points for values/info
- station, gridded, climate division options
- Heidke, Brier, RPSS, reliability diagrams
- Information/Help
 - Tutorial tab
 - Equations, methodology in '**Information**' panel
 - Clickable links in options and page (ie. '[?]')
 - Summaries at bottom of results (scroll down)
 - Warnings and errors, Copy 'Settings Used' for the '**Feedback**' tab