Partners Project Title Page
Proposal Type: GOES-R _____NWS X_____

Title: Analysis of Synoptic Patterns Associated with Wind-Driven Wildfires in the Southern Plains

Date: 25 July 2019

Signatures for University
University Name: Saint Louis University
Address: 1 N Grand Blvd.
St. Louis, MO 63103

Charles E Graves

Principal Investigator
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Telephone number:314-977-3121
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St. Louis, MO 63108 _____
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University Official (usually dept. chair)
Name (typed): Alexis Bruce-Staudt
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Norman, OK 73072

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SSD Chief
Name (typed): Gregory Patrick

__Steven Cooper Steven Cooper
Regional Director
Name (typed): Steven Cooper

SUMMARY OF BUDGET REQUEST:

COMET FUNDS: Year 1 $12,022 _____

NWS FUNDS: FY 1__0_____ FY 2___0_____

Analysis of Synoptic Patterns Associated with Wind-Driven Wildfires in the Southern Plains

Project Summary

Wildfire outbreaks in the Southern Plains of the United States have negatively impacted the region both socially and economically. These outbreaks occur when environmental conditions promote the rapid spread of wildfires. Past studies have identified common atmospheric patterns with these events. An ongoing collaboration between OUN and SLU has created a system-relative composite of atmospheric fields associated with past wildfire outbreaks. While these composite fields can be used by forecasters to build confidence in anticipating potential wildfire active days, the results are also incomplete. The environment of each wildfire event varies from the composite pattern. How much variability in those conditions is present among the events? Are there historical days similar to the composite pattern that are not associated with wildfires? In a sense, would it be useful for the forecaster to know, when an upcoming forecast is similar to the composite pattern, what are the Probability of Detection (POD) and False Alarm Ratio (FAR)?

Applying the Cooperative Institute for Precipitation Systems (CIPS) analog tools, but comparing the composite pattern to the individual wildfire events as well as the full NARR data set, provides the opportunity to estimate the POD and FAR of wildfire environmental patterns. Using a set of metrics (i.e., a similarity score) scores can be established for what is considered an acceptable match. From those matches, groups of “hits”, “misses”, and “false alarms” can be identified and POD and FAR computed. Furthermore, having a set of “hits” and “false alarms” will allow additional a refinement of the composite analysis and help identify discriminating features (i.e., how the hits and false alarms are different).

1. Research Objectives

Wildfire outbreaks in the Southern Plains of the United States have negatively impacted the region both socially and economically (NOAA NCEI 2019). These outbreaks occur when environmental conditions promote the rapid spread of wildfires. Schroeder et al. (1964) examined synoptic conditions of high fire load indices. They subjectively identified synoptic patterns based on the location of anticylones during periods of high fire load days. Of particular note was the pattern they identified as Chinook wind cases. Later, Lindley et al. (2011) examined environmental conditions on 99 days with reported wildfires in the Southern Plains and found conditions similar to the same Chinook wind environments Schroeder et al. (1964). More recently, Lindley et al. (2017) identified the Low-Level Thermal Ridge (LLTR) as a key feature of Southern Plains wildfires. The combination of these studies suggests that the anomalously warm, high-wind, low-humidity environments attending wildfires are associated with large-scale weather patterns that can be anticipated by forecasters.

Recent communications with the National Weather Service's Weather Forecast Office in Norman, OK (OUN) led to a composite study of wildfire outbreaks by a current graduate student (Matt Beitscher) at Saint Louis University (SLU). The study applied a system-relative compositing strategy centered on the mean sea level cyclone. Instead of traditional compositing techniques, in which all fields are composited based on their geographic location, this strategy shifts all cyclones in the composites to a mean location. Compositing with this strategy has significant benefits over geographic composites, especially in pattern and feature identification. System-relative composites more clearly represent synoptic features by identifying features and phenomena associated with the physical system.

Several composite fields from 28 wildfire events in the Southern Plains using the North American Regional Reanalysis (NARR) data are shown in Figs. 1-4 (note that the map background is centered on the average location of the surface cyclones and is provided for scale). The results highlight many previously-identified components of wildfire events. One of these features is known as a low-level thermal ridge (LLTR), as identified by Lindley et al. (2017). An LLTR is an anomalous tongue of warm air that extends into the center of a surface cyclone in its warm sector. This anomalous warmth is observed up to 850-hPa. A strong moisture gradient collocated with the LLTR, a low-level jet, and an upper-level jet streak are also observed. The strength of the low-level winds, as well as their orientation relative to the LLTR, have been shown to impact the spread of wildfires.

While these results can be used by forecasters to build confidence in anticipating potential wildfire active days, the results are also incomplete. The environment of each wildfire event varies from the composite pattern. How much variability in those conditions is present among the events? Are there historical days similar to the composite pattern that are not associated with wildfires? In a sense, would it be useful for the forecaster to

know, when an upcoming forecast is similar to the composite pattern, what are the Probability of Detection (POD) and False Alarm Ratio (FAR)?

For studies involving synoptic patterns, determining POD and FAR are often difficult. The researcher must find some method to assess the similarity between the current (or forecast) environment and the composite pattern. Thereby categorizing the event as a “hit”, a “miss”, or a “false alarm” when the pattern is similar. Assessing the similarity between environments has been applied over the last 10 years with the Cooperative Institute for Precipitation Systems (CIPS) historical analog guidance. Twice a day, the NAM and GFS forecast fields are compared to the NARR analysis to identify similar environments. Guidance is built using the top 15 most similar events and has been mentioned in over 1500 AFDs.

Applying the CIPS analog tools, but comparing the composite pattern to the individual wildfire events, as well as the full NARR data set, provides the opportunity to estimate the POD and FAR of wildfire environmental patterns. A set of metrics (i.e., a similarity score) can be obtained comparing the individual members to the composite. The range of those scores can define what is considered an acceptable match. Using the same set of metrics, the entire NARR data set can be search for other potential matches. From all of those matches, groups of “hits”, “misses”, and “false alarms” can be identified and POD and FAR computed. Furthermore, having a set of “hits” and “false alarms” will allow additional refinement of the composite analysis and help identify discriminating features (i.e., how the hits and false alarms are different).

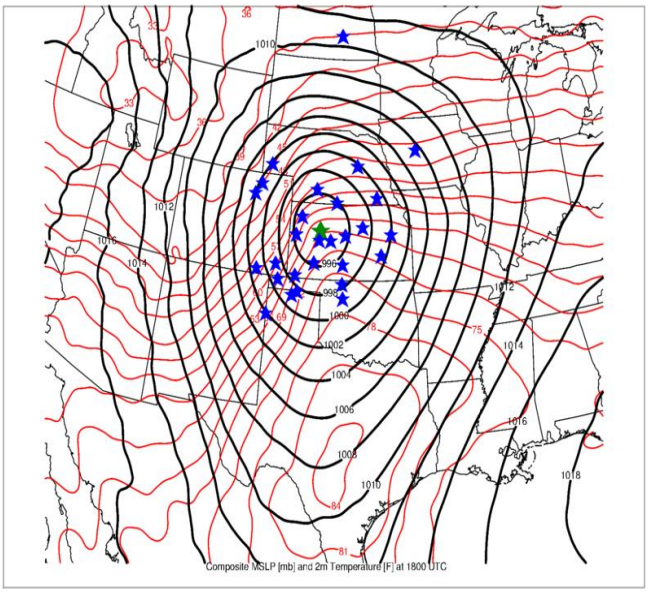

Figure 1. System-relative composites of wildfire events using NARR data of mean sea level pressure (mb; solid black) and 2 m temperature (F; solid red). The stars indicate the various surface cyclone centers of the 30 events in the composite. Note that the map background is for scale.

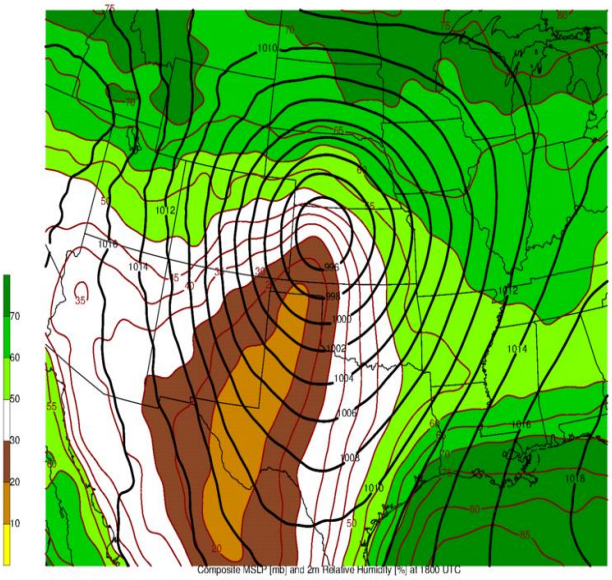

Figure 2. System-relative composites of wildfire events using NARR data of mean sea level pressure (mb; solid black) and 2-m relative humidity (%; shaded). Note that the map background is for scale.

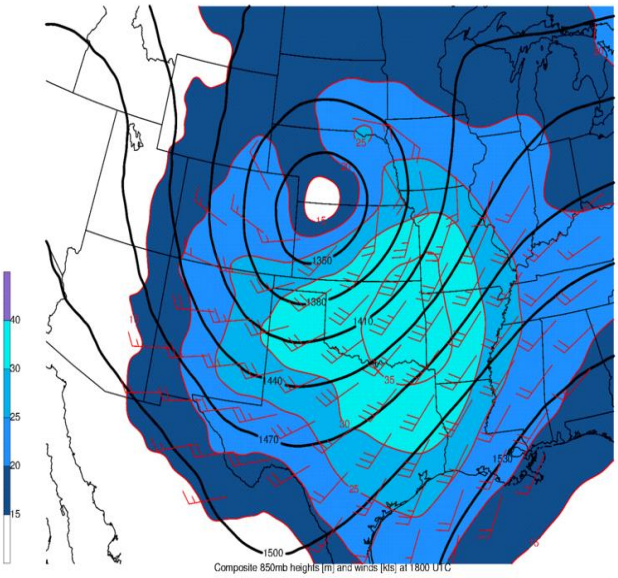

Figure 3. System-relative composites of wildfire events using NARR data of 850 mb geopotential height (m; solid black), 850 mb wind speed (kt; shaded), and 850 mb wind barbs greater than 15 kt (F; solid red). Note that the map background is for scale.

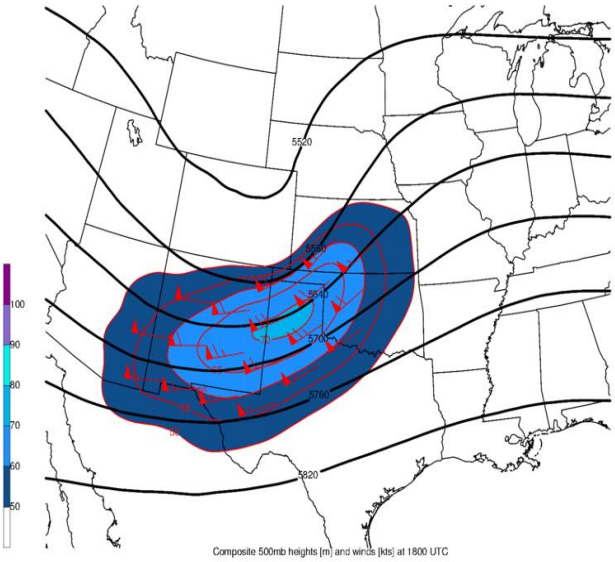

Figure 4. System-relative composites of wildfire events using NARR data of 500 mb geopotential height (m; solid black) 500 mb wind speed (kt; shaded), and 500 mb wind barbs greater that 50 kt. Note that the map background is for scale.

2. Research Tasks

Unless specified, the tasks listed below will be completed by a graduate student (i.e. Matt Beitscher) at SLU.

a. Compare existing composite patterns against individual events

Composite patterns like shown in Figs. 1-4 will be compared against each individual event. The comparison metrics applied include both the mean absolute difference (MAD) and spatial correlation (COR). Conversations with the forecasters at OUN will determine which fields to include and how important the magnitude of the pattern (i.e., MAD) is relative to the spatial pattern (i.e., COR).

The resulting scores from those matches will determine the threshold for what is considered a "hit" when comparing to the historical NARR record.

Additionally, the identification of wildfire events that score poorly may indicate the existence of different categories of wildfire events (e.g., the types A, B, and C as identified by Lindley et al 2017). Whether these poorly scoring events are associated with separate categories will be assessed by forecasters at OUN.

b. Interrogate and score the historical record

Using the same scoring methodology, the historical record of the NARR data will be searched for possible "hits". Because this is a system-relative analysis, the data set will be manually searched to identify surface cyclones progressing through the domain. This process will be completed by undergraduate students in the meteorology program at SLU.

Once cyclones have been identified and located, they will be scored in the same manner as the individual wildfire events that made up the composite. Those cyclones that score above the threshold established in task (a) will be included in the rest of the analysis. If evidence is found that these events were associated with wildfires they will be classified as "hits," otherwise they will be "misses."

c. Contingency table analysis

With a full complement of "hits", "misses", and "false alarms" a 2x2 contingency table and associated statistics will be computed, including POD and FAR. These statistics will provide a practical assessment of this pattern matching approach and will be presented to NWS forecasters with the opportunity for feedback on the methodology and results.

d. Additional analysis

A direct comparison of “hits” vs “false alarms” will be examined to possibility identify discriminating characteristics between the two categories. Furthermore, investigations into antecedent conditions and wildfire fuel potential may also prove useful.

3. Time Schedule

a. September - October 2019: Task (a)

Continuing conversations between OUN and SLU will be essential in defining the scoring metrics. Initial results will be shared in a one-on-one meeting at the NWA annual meeting in September.

b. October - November 2019: First part of Task (b)

Undergraduate students will be trained on how to identify and locate possible cyclones. The undergraduates will have weekly meetings with the graduate student to ensure a consistent methodology and to address unforeseen issues.

c. December 2019 - February 2020: Second part of Task (b) and Task (c)

Process cyclones identified previously, determine which meet the “hit” conditions. The forecasters at OUN will be consulted about wildfires associated with any potential systems identified as a “good” match. A trip is planned to OUN by PI and graduate student to present preliminary results and obtain feedback.

d. March - April 2020: Task (d)

After conversations with OUN, additional composite fields and/or additional data will be included in the composite analysis. A trip to OUN is planned in April to discuss final results and publications(s).

4. **Principal investigator (Short CV)**

Charles Edward Graves
Associate Professor, Chair
Department of Earth and Atmospheric Sciences
Saint Louis University

Education:

Ph. D. 1988: Physics, Iowa State University Ames, Iowa
B. A. 1982: Mathematics, Benedictine College Atchison, Kansas

Experience:

Chair, Department of Earth and Atmospheric Sciences. Saint Louis University, July 2018 – Presentation

Associate Professor, Saint Louis University, Department of Earth and Atmospheric Sciences July 1997 - Present

Assistant Professor, Saint Louis University, Department of Earth and Atmospheric Sciences January 1992 - June 1997

Research Associate, Climate System Research Program, Department of Meteorology, Texas A&M, July 1988 - December 1991.

Publications (peer reviewed, since 2007):

McCoy, L. P., P. S. Market, C. M. Gravelle, C. E. Graves, N. I. Fox, S. M. Rochette, J. Kastman, and B. Svoma, 2017: Composites of Heavy Rain Producing Elevated Thunderstorms in the Central United States. *Adv. Meteorology*, **2017**, 19 pp.

Sanders, K. J., C. M. Gravelle, J. P. Gagan, and C. E. Graves, 2013: Characteristics of major ice storms in the central United States. *J. Operational Meteor.*, **1** (10), 100–113.

Gosselin, J. P., C. M. Gravelle, C. E. Graves, J. P. Gagan, and F. H. Glass, 2011: Composite Analysis of Heavy Snow Events within the Springfield and St. Louis, Missouri National Weather Service County Warning Areas. *Natl. Wea. Dig.*, **35**, 57-81.

Vitale, J., J. Moore, C. Graves and M. Kelsch, 2009: Hydrometeorological Aspects of the Kansas Turnpike Flash Flood of 30-31 August 2003, *Natl. Wea. Dig.*, December 2009, **33:2**, 203-218.

Eisenacher, E. B., and C. E. Graves, 2009: The evolution and time scale of mesoscale processes that created an intense mesoscale snowband on 15 March 2004 in Des Moines, IA, *NWA Electronic J. Operational Meteor*.

Graves, C. E., R. Wolf, J. T. Moore, J. Zogg and B. Mickelson, 2007: Analysis of the 3-4 June 2002 extreme rainfall event of over Iowa and Illinois, *Natl. Wea. Dig.*, **31**, 83-102.

Selected Posters/Presentations:

Elmore, A., C. Graves, C. Gravelle, and J. Sieveking, 2019: Assessment of CIPS Analog-Based Severe Probability Guidance, 2018 NWA Iowa Severe Storms Conference

Perez, K., A. Elmore, C. Gravelle, C. Graves 2018: Analysis of the Top Significant Fields in Analog-Based Severe Probability Guidance, 2018 NWA Annual Meeting

Elmore, A., K. Perez, C. Gravelle, C. Graves 2018: Analog-Based Severe Probability Guidance, 2018 NWA Annual Meeting

Elmore, A., K. Perez, C. Graves, and C. Gravelle, 2018: Analog-Based Severe Probability Guidance, 2018 NWA Iowa Severe Storm Conference

Elmore, A., K. Perez, C. Graves, and C. Gravelle, 2017: SLU-CIPS Analog-Based Severe Probability Guidance, 2017 SPC

Elmore, A., K. Perez, C. Graves, and C. Gravelle, 2017: SLU CIPS CSTAR Severe Probability Guidance, SE SOO Workshop, July 2017

Gravelle, C, A. Elmore, K. Perez, M. Flanagan, and C. Graves, 2017: Winter SLU/CIPS Analog Exercise, 4 November 2017, Winter Weather Workshop, Saint Louis University.

Graves, C. and C. Gravelle, 2017: CIPS Analog Guidance, Science and Operations Officer (SOO) Development Course, National Weather service, Kansas City, KS, Invited Presentation and Lab Exercise, 9 August 2017

Gravelle, C. and C. Graves, 2015: CIPS Analog Guidance, COMET Mesoscale Analysis and Prediction (COMAP) Invited Presentation and Lab Exercise, 15 July 2015

Gravelle, C. and C. Graves, 2014: CIPS Historical Analog System Teletraining, 18 November 2014 and 20 November 2014, National Weather Service Webinar (numerous forecast offices)

Market, P., L. McCoy, C. Gravelle, and C. Graves, 2014: Improving Prediction of Heavy Rainfall with Elevated Convection, 21 October 2014, National Weather Association Annual Meeting

Recent Funded Grants:

Graves, C. E., 2016: Using Reforecast and Historical Observations to Assess the Potential for Severe Weather in the Extended Forecast Period, NOAA/CSTAR, $213,239, May 2016 – April 2019.

Graves, C.E., 2010: A Composite Analysis of Major Ice Storm Events in the County Warning Area of Springfield, Missouri, UCAR/COMET, $11,614, October 2010 - June 2011 (Saint Louis University provided matching tuition scholarship of 6 credits).

Eichler, T. and C.E. Graves, 2009: A Proposal to Update Computing Hardware to Support Weather and Climate Initiatives at Saint Louis University via Unidata Activities, NSF/Unidata, $6,017, May 2009 - May 2010 (with $12,000 matching from Saint Louis University).

5. Project Contributions

a. SLU will contribute PI time
b. SLU will support graduate student (Matt Beitscher)
c. OUN will assess the results of this investigation operationally
    i. OUN will help look back at poorly matching wildfire events that occurred in the past to document possible additional categories of wildfire environments.
    ii. OUN will develop procedures to apply results from this study in an operational setting

6. Budget - SLU

a. Travel for PI and Matt Beitscher to NWA annual meeting ($1800 + $1600)
b. Travel for Matt Beitscher to AMS annual meeting ($1675)
c. Travel for PI and Matt Beitscher to Norman, OK WFO in October ($950)
d. Travel for PI and Matt Beitscher to Norman OK WFO in April ($950)
e. Hourly wages for undergraduate students to aid in finding dates (i.e. task 2b; 80 hours @ 12/hr; $960)

Total: $7935
Indirect (51.5%) $4087

Total request: $12,022

7. References

Lindley, T. T., J. D. Vitale, W. S. Burgett, M.-J. Beierle, 2017: Proximity Meteorological Observations for Wind-driven Grassland Wildfire Starts on the Southern High Plains, *E-J. Severe Storms Meteor.*, **6**, 1

Lindley, T. T., B. R. Bowers, G. P. Murdoch, B. R. Smith, and C. M. Gitro, 2017: Analyses of Fire-effective Low-level Thermal Ridges on the Southern Great Plains. *J. Operational Meteor.*, **5** (12), 146-160 DOI: https://doi.org/10.15191/nwajom.2017.0512 8/31/2017

NOAA National Centers for Environmental Information (NCEI), 2019: U.S. Billion-Dollar Weather and Climate Disasters. Retrieved from https://www.ncdc.noaa.gov/billions/

Werth, P. A., Potter, B. E., Alexander, M. E., Clements, C. B., Cruz, M. G., Finney, M. A., … McAllister, S. S. (2016). *Synthesis of knowledge of extreme fire behavior: Volume 2 for fire behavior specialists, researchers, and meteorologists*. Retrieved from http://www.treesearch.fs.fed.us/pubs/50530

Project Budget Page

	COMET Funds	NWS Contributions
University Senior Personnel		
1.		**NA**
2.		**NA**
Other University Personnel		
1. Student Labor (hourly: 80 hrs*$12/hr)	**$960**	**NA**
2.		**NA**
Fringe Benefits on University Personnel		**NA**
Total Salaries + Fringe Benefits	**$960**	**NA**
NWS Personnel		
1.	**NA**	(# of hours)
2.	**NA**	(# of hours)
Travel		
1. Research Trips	**$1900**	
2. Conference Trips	**$5075**	
3. Other		
Total Travel	**$6975**	
Other Direct Costs		
1. Materials & Supplies		**NA**
2. Publication Costs (put in the NWS column if a co-author will be an NWS employee)		
3. Other Data		
4. NWS Computers & Related Hardware	**NA**	
5. Other (specify)		
Total Other Direct Costs	**$0**	
Indirect Costs		**NA**
1. Indirect Cost Rate	**51.5%**	
2. Applied to which items?	**All ($7935)**	
Total Indirect Costs	**$4087**	**NA**
Total Costs (Direct + Indirect)	$12,022	

NWS Checklist for Submitting a COMET Outreach Proposal

Actions Before Proposal is Submitted to COMET	YES	NO	DATE
1. Did NWS office staff and university staff meet to discuss and form outline and scope of project?	Y		4/22/19
2. Did NWS office consult Scientific Services Division (SSD) staff?	Y		7/29/19
3. Was Statement of Work and budget formulated as a team effort between university and NWS staffs?	Y		6/7/19
4. Was proposal submitted to SSD for review?	Y		
5. Did SSD forward copies of proposals dealing with WSR-88D data to Radar Operations Center (ROC), Applications Branch Chief for review?		N/A	
6. Did SSD forward copies of proposals dealing with hydrometeorology to the Senior Scientist of OHD for review?		N/A	
7. Did SSD review the data request for project to ensure its scope and criticality for proposal?	Y		8/9/19
8. Is all data for the project being ordered by NWS offices through the National Climatic Data Center's (NCDC) Research Customer Service Group free of charge?	Y		8/9/19
9. Does budget include publication charges and travel costs for NWS employees to present results at scientific conferences?		N/A	
10.Does budget separate NWS costs into fiscal year costs and university costs into calendar year costs?	Y		8/9/19
11.Does proposal include a separate justification for university hardware purchases which are usually not funded by the COMET Outreach Program?		N/A	
12. Have the following people signed off on the proposal cover sheet: - MIC/HIC? - SSD Chief? - Regional Director?	Y		8/20/19
13. Is a letter of endorsement signed by regional director attached?	Y		8/20/19

NWS Checklist for Submitting a COMET Outreach Proposal

Actions after Endorsement by NWS	YES	NO	DATE
1. University submits proposal to the COMET Program.			
2. Proposal acknowledgment letter sent by the COMET Program to submitting university with copies to SSDs and NWS office.			
3. COMET review of proposal (internal review for Partners Project proposals and formal review for Cooperative Project proposals).			
4. The COMET Program sends acceptance, rejection, or modification letters to university with copies to SSD, NWS office, and OST12.			
5. The COMET Program allocates funds for university.			
6. OST12 obligates funds for NWS offices.			
7. SSD/NWS office orders data from NCDC.			
8. NWS office or SSD calls OST12 for accounting code for expenses.			
9. NWS office sends copies of all travel vouchers and expense records to OST12.			
10. NWS office or SSD sends copies of publication page charge forms to OST12.			
11. NWS office keeps SSD informed of progress on the project and any results or benefits derived from the project.			

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service Southern Region Headquarters
819 Taylor Street, Room 10E09
Fort Worth TX 76102

August 20, 2019

MEMORANDUM FOR: Ms. Lorrie Alberta
COMET Outreach Program Administrator
3085 Center Green Drive
Boulder CO 80301

FROM: Steven Cooper, Director
NWS Southern Region Headquarters

SUBJECT: Letter of Support for COMET Partners Proposal

National Weather Service, Southern Region Headquarters, fully supports the COMET Partners Proposal titled "Analysis of Synoptic Patterns Associated with Wind-Driven Wildfires in the Southern Plains."

If this proposal is funded, forecasters at the NWS Weather Forecast Office Norman, OK (OUN) will collaborate with researchers at Saint Louis University (SLU) to investigate the synoptic patterns associated with wildfire outbreaks in the Southern Plains. This collaboration effort builds on recent studies at both SLU and OUN that have created system-relative composite charts that highlight the importance of the low-level thermal ridge on wildfire outbreak days.

The results of the activities listed in the proposal have a high potential for improving Impact-Based Decision Support Services (IDSS) at not only the Norman, OK Weather Forecast Office but also at a number of other WFOs across Nebraska, Kansas, Oklahoma, and west Texas.

The research activities outlined in the proposal have a high potential to translate into improved WFO operations within 2 years. The results of the assessment of the pattern-matching approach to identifying wildfire outbreak days can be used to increase forecaster confidence in the short- to medium-range prediction of extremely critical fire weather conditions.

We support the commitment of Dr. Charles Graves, Mr. Matt Beitscher, and others on the SLU team to work with the NWS Norman forecast office to improve the forecasting and messaging of wildfire outbreaks in the Southern Plains. Thank you for considering this proposal.

COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN: 1430654872A1

ORGANIZATION:

St. Louis University
221 North Grand Blvd.
DuBourg Hall, Room 202
Saint Louis, MO 63103

DATE:05/02/2018

FILING REF.: The preceding agreement was dated 04/06/2017

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

SECTION I: INDIRECT COST RATES

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)

	EFFECTIVE PERIOD				
TYPE	**FROM**	**TO**	**RATE(%)**	**LOCATION**	**APPLICABLE TO**
PRED.	07/01/2015	06/30/2016	51.50	On Campus	Organized Research
PRED.	07/01/2015	06/30/2016	45.00	On Campus	Instruction
PRED.	07/01/2015	06/30/2016	27.50	On Campus	Other Sponsored Activities
PRED.	07/01/2015	06/30/2016	26.00	Off Campus	All Programs
PRED.	07/01/2016	06/30/2020	51.50	On Campus	Organized Research
PRED.	07/01/2016	06/30/2020	45.00	On Campus	Instruction
PRED.	07/01/2016	06/30/2020	27.50	On Campus	Other Sponsored Activities
PRED.	07/01/2016	06/30/2020	26.00	Off Campus	All Programs
PROV.	07/01/2020	06/30/2022			Use same rates and conditions as those cited for fiscal year ending June 30, 2020.

*BASE

Modified total direct costs, consisting of all direct salaries and wages, applicable fringe benefits, materials and supplies, services, travel and up to the first $25,000 of each subaward (regardless of the period of performance of the subawards under the award). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, rental costs, tuition remission, scholarships and fellowships, participant support costs and the portion of each subaward in excess of $25,000. Other items may only be excluded when necessary to avoid a serious inequity in the distribution of indirect costs, and with the approval of the cognizant agency for indirect costs.

ORGANIZATION: St. Louis University
AGREEMENT DATE: 5/2/2018

SECTION I: FRINGE BENEFIT RATES**

TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
FIXED	7/1/2017	6/30/2018	28.40	All	Full Time Employees
FIXED	7/1/2017	6/30/2018	14.80	All	Part Time Employees
FIXED	7/1/2017	6/30/2018	16.30	All	UMG Employees
FIXED	7/1/2018	6/30/2019	29.30	All	Full Time Employees
FIXED	7/1/2018	6/30/2019	16.00	All	Part Time Employees
FIXED	7/1/2018	6/30/2019	16.10	All	UMG Employees
PROV.	7/1/2019	6/30/2021			Use same rates and conditions as those cited for fiscal year ending June 30, 2019.

** DESCRIPTION OF FRINGE BENEFITS RATE BASE:

Salaries and wages.

SECTION II: SPECIAL REMARKS

TREATMENT OF FRINGE BENEFITS:

The fringe benefits are charged using the rate(s) listed in the Fringe Benefits Section of this Agreement. The fringe benefits included in the rate(s) are listed below.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

OFF-CAMPUS DEFINITION: For all activities performed in facilities not owned by the institution and to which rent is directly allocated to the project(s) the off-campus rate will apply. Grants or contracts will not be subject to more than one F&A cost rate. If more than 50% of a project is performed off-campus, the off-campus rate will apply to the entire project.

Equipment Definition -
Equipment means an article of nonexpendable, tangible personal property having a useful life of more than one year and an acquisition cost of $5,000 or more per unit.

FRINGE BENEFITS:

FICA	Health Insurance
TIAA/CREF	Tuition Remission
Retirement	Child Care Subsidy
Disability Insurance	EAP
Worker's Compensation	Jesuit Benefit
Life Insurance	Wellness Program
Unemployment Insurance	Adoption Assistance

Per 2 CFR 200.414(g) - A rate extension has been granted.

The next fringe benefits rate proposal, based on actual costs for FYE 6/30/2018, is due in our office by 12/31/2018.

The next indirect cost rate proposal, based on actual costs for fiscal year ending 06/30/2019, will be due no later than 12/31/2019.

SECTION III: GENERAL

A. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted: such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Title 2 of the Code of Federal Regulations, Part 200 (2 CFR 200), and should be applied to grants, contracts and other agreements covered by 2 CFR 200, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:	ON BEHALF OF THE FEDERAL GOVERNMENT:
St. Louis University	DEPARTMENT OF HEALTH AND HUMAN SERVICES
(INSTITUTION)	(AGENCY)
(SIGNATURE)	Arif M. Karim -S Digitally signed by Arif M. Karim -S DN: c=US, o=U.S. Government, ou=HHS, ou=PSC, ou=People, cn=Arif M. Karim -S, 0.9.2342.19200300.100.1.1=2000212895 Date: 2018.05.08 16:41:17 -05'00'
	(SIGNATURE)
Matthew Christian	Arif Karim
(NAME)	(NAME)
Associate Vice President for Research	Director, Cost Allocation Services
(TITLE)	(TITLE)
5-10-2018	5/2/2018
(DATE)	(DATE) 6315

HHS REPRESENTATIVE: Theodore Foster

Telephone: (214) 767-3261