1.5h

1.5h

Parallel Session: Monday 13 September 2021

PP-AWARE (WG5, WG4 joint with WG7), Room: PLUTO **Chair:** Flora Gofa and Anastasia Bundel		
13:20 – 13:30	F. Gofa, A Bundel	Set-up and Welcome (minutes)
13:30 – 15:00	F. Gofa, A. Bundel (10')	Progress of PP-AWARE – Short Extension
	A Bundel (for A Muravev) (15')	Overview of appropriate verification measures for HIW - Extreme Value Theory (EVT) approach (Task 2.3)
	A. Mazur, J. Linkowska (15')	Verification of forecasts of intense convective phenomena (Task 3.1)
	A Bundel (15')	MET application for gridded COSMO-Ru/ICON forecasts (Task 3.3)
	P. Gregor/M Hoff (15')	Verification of precipitation objects from SINFONY-RUC simulations during summer 2021 (Task 3.6)
	F. Gofa, D. Boucouvala (15')	LPI evaluation and correlation with thermodynamical indices (Task 3.5)
15:00-15:15	***All***	***BREAK***
15:15-16:30	D. Cattani (15')	Calibration of the Lightning Potential Index (LPI) in COSMO-1E and COSMO-2E (Task 3.2)
	C. Marsigli (for M. Salmi) (15')	Verification of the LPI of COSMO-D2-EPS against lightning
	D. Zakharchenko (15')	Convective indices for predicting tornado risk with COSMO-Ru
	Y. Khlestova (15')	Postprocessing model data for fog forecast
	All (15')	AWARE future – PT on EPS Spatial Verification

AWARE: Appraisal of "Challenging WeAther" FoREcasts

DWD: C. Marsigli, M. Hoff, G.Pante, **MCH:** D. Cattani, **HNMS:** F. Gofa, D. Boucouvala, **IMGW-PIB:** A. Mazur, J. Linkowska, G. Duniec, **RHM**: A. Bundel, A.Muraviev, E.Tatarinovich, **ARPAE:** M.S. Tesini

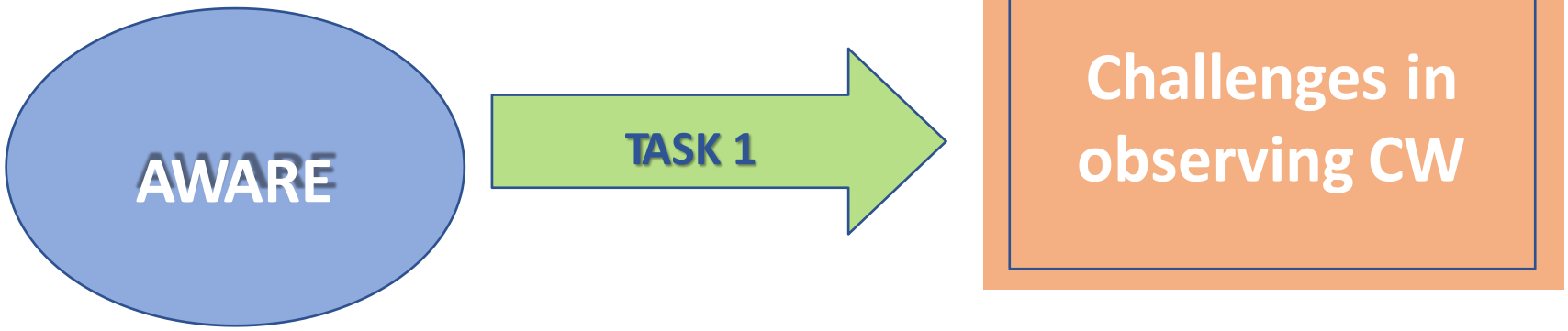
Project Period: 2019-2021

http://www.cosmo-model.org/content/tasks/priorityProjects/aware/default.htm

Focus of the study is to provide COSMO Community with an overview of forecast methods and forecast evaluation approaches that are linked to high impact weather.

Project Extension requested:

- **Short prolongation is proposed** to complete Tasks and provide the related deliverables. The requested extension is until the **end of December 2021**.
- Delays in **Tasks 1.2, 2.3, 3.3. 4.1, and 4.4**. The delays are due to partial unavailability of some contributors due to health issues and other constraints.
- Consolidation of the outcomes of the project tasks will be made during the extension period to provide the **Executive Summary** of the project.
- Final project **technical report** will be delivered at the new deadline.
- The deliverable reports are available on the PP AWARE web page on the COSMO web site (http://www.cosmo-model.org/content/tasks/priorityProjects/aware/default.htm).
- Unused FTEs from the main project period will be relocated to the extension period of the project. **No additional FTEs are requested. The total resources are equivalent to 0.45 FTE.**
- As PP-AWARE is quite extensive in the variability of subjects that were approached. during the GM2021, a discussion will take place among WG5, WG4 and WG7 on the possibility to initiate a new PP/PT that will focus on issues that were not adequately analyzed such as spatial verification applications on convection permitting EPS systems or the role of new obs types in the evaluation of intense weather phenomena.



Task 1.1 Overview of CW/HIW observational data sources characteristics
Task 1.1.1 (IMGW-PIB) 0.1FTEs Task 1.1.2 (RHM) 0.05 FTEs
Task 1.1.3 Review of non conventional observations and their use in verification 0.1FTEs

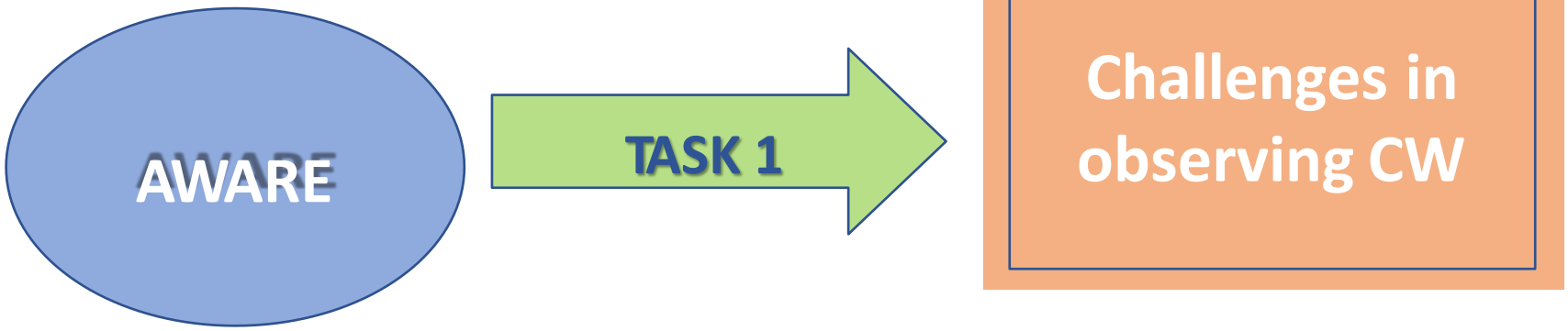
Intercomparison of diagnostic methods for thunderstorm activity, including accuracy estimates based on selected test cases. Assessment of usefulness of particular observational data sources, keeping in mind the criteria of validity, long period of observation, “whitelisted” quality, accessibility, etc. Recommendations of the usage.

Report on the consequent steps of work, with particular attention paid to the recommendations, mainly in terms of easy access to data.

FTEs remaining: 0.0

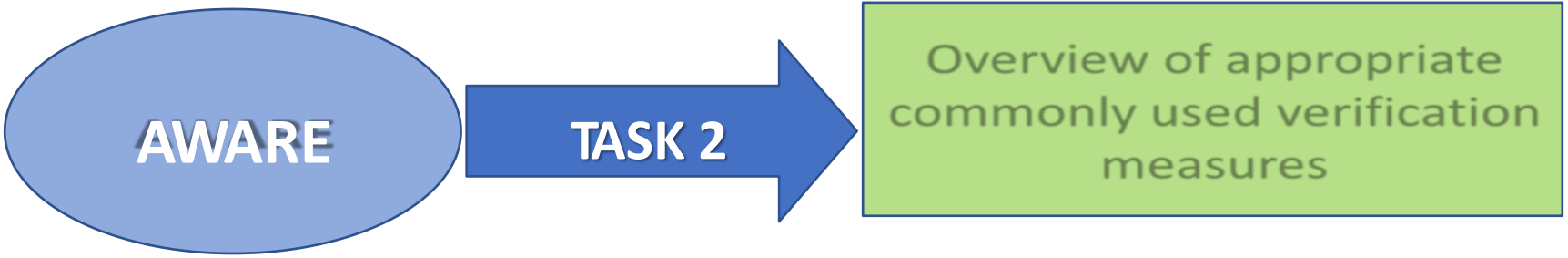
STATUS: Completed

Final report wasprepated based on A.Mazur and A. Bundel work and C.Marsigli et al. paper (https://nhess.copernicus.org/articles/21/1297/2021/nhess-21-1297-2021.html) and presentations.



Task 1.2. **Approaches to introduce observation uncertainty - 0.05 FTEs**
Analysis of literature about the methods to introduce observation uncertainty for the HIW phenomena of intense precipitation, extreme temperatures and winds.
Analysis of available datasets
Tests with the new scores accounting for observation uncertainty
Report on existing methods to introduce observation uncertainty and an overview of novel verification scores accounting for observation uncertainty (e.g., CRPS adapted for observation ensemble).

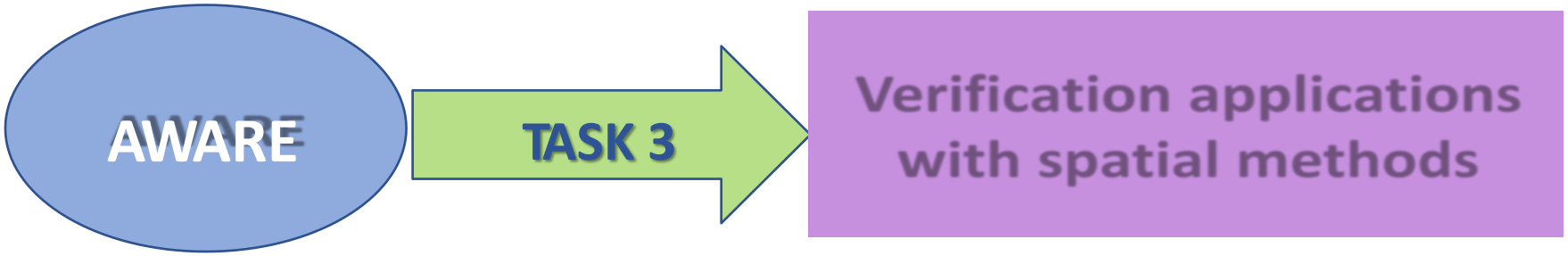
FTEs remaining: 0.02 A. Bundel
STATUS: Pending Report
Task delayed. Only an overview is under preparation. As practical implementation: spatial scores using the radar precipitation data and nowcasting zero step data as reference are planned. Extension without additional FTEs is required to finish the task by the end of year 2021.



Task 2.1 Survey for assessment of proper verification of phenomena 0.35FTEs
Comparison and judgment whether continuous or discrete methods may/should be applied. Report on the work steps, possibly papers in peer-reviewed journals and suggestions/recommendations of method to be selected.
FTEs remaining: 0.0
STATUS: Pending Revision of Report: with applicability of recommended methods and suggestions for parameters to account for flash rate derived from forecast data.

Task 2.2 Role of SEEPS and EDI-SEDI for the evaluation of extreme precipitation forecasts - 0.25FTEs
Report on the description of the method that is followed for the evaluation of precipitation forecasts over Greece. Statistical results based on chosen case studies
FTEs remaining: 0.0
STATUS: Completed. *Final Report available on COSMO web*

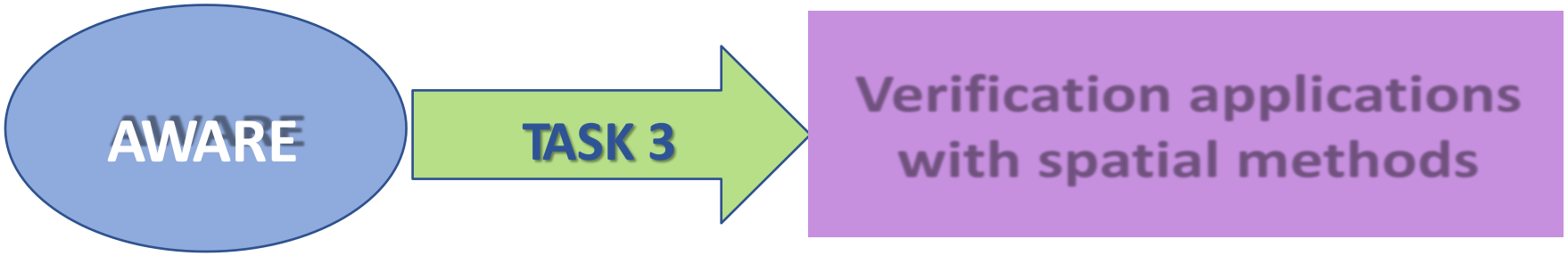
Task 2.3 Extreme Value Theory (EVT) approach- Fitting precipitation object characteristics to different distributions - 0.3FTEs
FTEs remaining: 0.0
STATUS: Pending Final Report. *To be submitted by the end of project extension.-* ***PRESENTATION***



Task 3.1 Verification of forecasts of intense convective phenomena - 0.5FTEs
Report on the verification approach, recommendations and considerations.
FTEs remaining: 0.1 - PRESENTATION
STATUS: ***Completed, Pending Report Revision*** with the analysis on thermodynamical indices. *First draft report available on COSMO web*

Task 3.2 Lightning potential index (LPI) in mountain regions
Integration in the operational chain of COSMO-1, and COSMO-E, Tests of the flash conversion rate LPI to flash numbers, Comparison with the IFS products
FTEs remaining: 0.0 - PRESENTATION
STATUS: ***Completed.*** *Final Report available on COSMO web*

Task 3.3. CRA and FSS analysis on intense precipitation - 0.3FTEs
Bug-fixing in craer R SpatialVx function (partially based on idealized cases). CRA and FSS analysis on MesoVICT cases. Running CRA and FSS on summer and winter periods for the Central Russia COSMO-Ru and radar fields. CRA scores and the FSS analysis for intense precipitation and (possibly) reflectivities.
FTEs remaining: 0.2 - PRESENTATION
STATUS: ***Pending Final Report.*** *Task is delayed. The first results using MET mode tool and MET tools for ensemble scores to be shown at the GM.* ***Extension to complete Task until end of 2021.***



Task 3.4 DIST methodology tuned on high-threshold events for flash floods forecast evaluation - 0.1FTEs

Verification of average values of precipitation over catchment areas will be used to investigate the ability of models in reproducing different amounts of precipitation.

FTEs remaining: 0.0

STATUS: ***Completed.*** *Final Report available on COSMO web*

Task 3.5 LPI verification and correlation of convective events with microphysical and thermodynamical indices - 0.3FTEs

Selection of intense precipitation events preferably for various weather regimes.

Construction of gridded observation datasets based on HNMS lightning network

Application of spatial methods techniques on lightning forecasts derived from models with different resolution mainly focused on structural characteristics

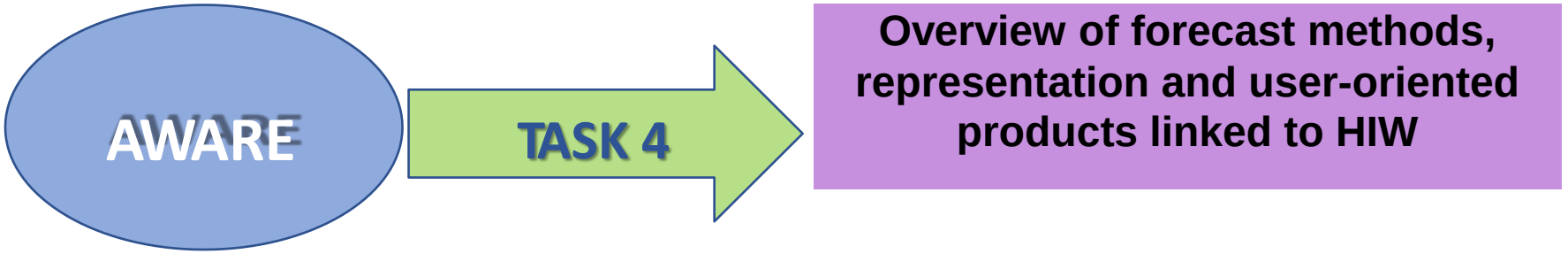
FTEs remaining: 0.04 - PRESENTATION

STATUS: ***Completed, Pending Final Report.*** *To be submitted until Sept 2021.*

Task 3.6 Work on the comparative verification of NWC and NWP results using spatial verification methods as part of the SINFONY project at DWD 0.16FTEs

FTEs remaining: 0.0 - PRESENTATION

STATUS: ***Completed.*** *Final Report available on COSMO web*



Task 4.1. Postprocessing vs. direct model output for HIW – 0.5FTEs

Studying literature, internet search to understand the state-of-the art in fog/visibility modelling, and in postprocessing methods to predict fog/visibility and convection related CW and the overview of these methods

FTEs remaining: 0.0 - PRESENTATION

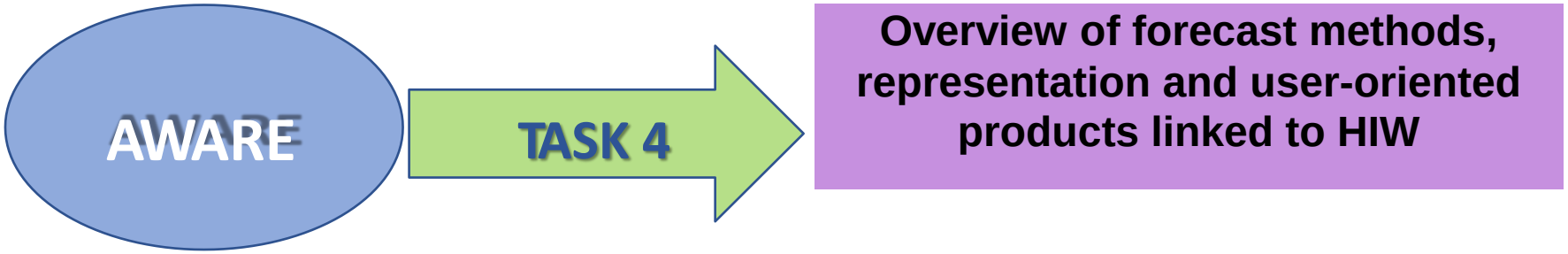
STATUS: ***Pending Final Reports:*** *An overview of fog forecast DMO and postprocessing approaches. Study of convective indices to predict supercell formation and tornado risk in Russia using the COSMO model (Zakharchenko).* ***Extension to complete the reports until Dec 2021.***

Task 4.2 Improving existing post-processing methods – 0.12FTEs (initially planned 0.25 FTEs, but 0.13 FTEs for year 2020-2021 moved to MILEPOST)

Report on the quality of various forecasts methods, advantages and disadvantages; conclusions (recommendations) of hind-cast evaluation, esp. of ANN vs. MLR and ALSR; recommendations for future and operational use

FTEs remaining: 0.0

STATUS: ***Completed.*** *Final Report available on COSMO web*



Task 4.3 QPF evaluation approaches – 0.1 FTEs
An overview of all the products provided to the end-user (forecaster or hydrologist)
FTEs remaining: 0.0
STATUS: Completed. *Final Report available on COSMO web*

Task 4.4. Representing and communicating HIW forecast for decision making – 0.3 FTE (0.2 RHM, 0.1 NMA)
Overview of approaches to communicating high impact weather to different categories of users. Feedback from users.
Examples of representing HIW forecasts.
FTEs remaining: 0.11 RHM, 0.1 NMA
STATUS: Pending Final Report. A.Bundel is preparing the report "Preparing and communicating warnings based on high-resolution NWP in the cities, international experience and Moscow applications". ***Extension to complete the reports until 2021.***
NMA contribution is most likely will be cancelled.

Related publications & conference presentations

1. Marsigli, Chiara & Ebert, Elizabeth & Ashrit, Raghavendra & Casati, Barbara & Chen, Jing & Coelho, Caio & Dorninger, Manfred & Gilleland, Eric & Haiden, Thomas & Landman, Stephanie & Mittermaier, Marion. (2020). Observations for high-impact weather and their use in verification. 10.5194/nhess-2020-362.

2. Object based verification of radar-reflectivities on the convective scale
   G. Pante, M. Hoff, and U. Blahak. Deutscher Wetterdienst, Offenbach, Germany.
   Presented in ICCARUS 2021

3. Verification of Intense Precipitation over diverse climatological areas Boucouvala D.1, Gofa F. 1 and Kolyvas C.1. HNMS. Paper submitted and will be presented in COMECAP 2021.

4. Murayev….. (under preparation)

5. More?

SEND ANY AWARE RELATED PUBLICATIONS

Project Recount

PP-AWARE (2019-2021)

Question 1: How well high-impact weather is represented in the observations, including biases and random errors, and their sensitivity to observation density?

Survey of obs types and peculiarities for verification purposes completed

Review on HIW Obs uncertainty impact ongoing, not applications though

Question 2: How well high-impact weather forecast quality is represented with commonly used verification measures?

Survey on convective weather verification measures, guidelines (ongoing)

SEEPS: precipitation	Model: Det
EDI-SEDI: precipitation	Model: Det
EVT: precipitation	Model: Det

Concentrated only on intense precipitation and convective weather. Only DetMod

Question 3: Can spatial verification methods contribute to the proper evaluation of HIW phenomena and in what way?

SAL: LPI, precipitation, flashrate	Model: Det
CRA: precipitation, reflectivities	Model: Det (ongoing)
FSS: precipitation, reflectivities	Model: Det (ongoing)
DIST: precipitation	Model: Det
TI, MMI: reflectivities	Model: Ens

Restricted parameter/phenomena. No adequate spatial applications/suggestions on ensemble fcts

Questions raised

PP-AWARE (2019-2021)

Question 4: How well is HIW is represented in postprocessing? What are the pros/cons of DMO vs. PostPro with respect to HIW phenomena predictions? What is the current predictive skill, and the user's interpretation of forecast value in high-impact weather situations (observed and/or forecast)?

HIW phenomena studied: visibility range (fog), thunderstorms (w. lightning), intense precipitation, extreme temperatures and winds.

HIW phenomena studied: intense precipitation, thunderstorm (lightning activity, visibility range (fog).

HIW phenomena studied: intense precipitation, thunderstorm (lightning activity LPI, visibility range (fog).

HIW phenomena studied: fog/visibility, convection related CW (thunderstorms, lightning, hail, squalls, showers, flash floods)