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Friends & Partners
IN AVIATION WEATHER

Enhancing METAR Literacy with Immersive Visualizations via asosweather.com

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Chandler Zuck | zuckc@my.erau.edu | Embry-Riddle Aeronautical University – Daytona Beach

- Flying since 2020, trained in Alaska & Florida
- Lead Tutor and Supplemental Instructor at ERAU
- Senior B.S. Meteorology Undergraduate

How can we visualize this weather story?

METAR KDAB 080253Z 07004KT 10SM FEW029 25/21 A3005 RMK AO2 SLP176 T02500211 50008METAR KDAB 080153Z 08005KT 10SM FEW029 25/22 A3006 RMK AO2 SLP177 T02500217
METAR KDAB 080053Z 08005KT 10SM FEW065 26/21 A3005 RMK AO2 SLP174 T02560211
METAR KDAB 072253Z 09007KT 10SM FEW065 27/21 A3002 RMK AO2 SLP165 T02670211
METAR KDAB 072153Z 11009G16KT 10SM FEW026 FEW065 28/21 A3002 RMK AO2 SLP163 T02780211METAR KDAB 072053Z 08010G21KT 10SM FEW026 FEW031 SCT065 28/22 A3001 RMK AO2 SLP163 T02830217 56010
METAR KDAB 071953Z 09014G23KT 10SM FEW027 BKN033 29/22 A3002 RMK AO2 SLP163 T02890217
METAR KDAB 071853Z 10010G19KT 10SM BKN070 28/22 A3003 RMK AO2 SLP167 T02830217METAR KDAB 071753Z 10009G17KT 10SM BKN050 28/22 A3004 RMK AO2 SLP173 60022 T02830222 10294 20250 58006
METAR KDAB 071653Z 10013G21KT 10SM BKN046 29/23 A3005 RMK AO2 SLP175 T02890228
METAR KDAB 071553Z 10010G22KT 10SM FEW020 SCT028 BKN036 29/23 A3006 RMK AO2 SLP179 T02890233
METAR KDAB 071453Z 09008G18KT 10SM FEW027 SCT034 BKN060 28/24 A3006 RMK AO2 RAE08 SLP179 P0001 60022 T02830239 51015

How can we visualize this weather story?

```
KDAB   GFS LAMP GUIDANCE  10/08/2025  0230 UTC
DT /OCT   8                                                            /OCT   9
HR   01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
UTC  03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16
TMP  77 77 76 76 75 75 75 74 75 75 79 82 84 84 85 84 84 84 83 82 80 79 78 78 78 77 77 76 76 76 76 75 75 76 80 82 84 84
DPT  71 71 71 71 71 72 72 72 72 73 76 75 74 74 74 74 74 74 74 73 73 73 73 73 73 73 73 73 72 72 72 73 73 73 74 74 73 73
WDR  08 08 08 09 08 08 07 08 07 07 06 07 06 06 06 05 06 05 05 05 04 04 04 05 05 05 05 05 05 04 04 04 04 03 04 04 04 04
WSP  04 04 04 03 03 03 03 02 02 02 04 06 08 08 09 10 11 11 12 10 09 08 07 06 05 04 04 04 04 05 06 06 06 06 09 12 14 15
WGS  NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG NG 22 23
PPO   0  0  0  0  0  0  0  1  1  1  2  3  3  3  3  3  3  3  2  1  1  0  0  0  0999999999999999999999999999999999999999
PCO   N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  X  X  X  X  X  X  X  X  X  X  X  X  X
P01   0  0  0  0  0  0  1  1  1  1  3  4  1  4  9  5  3  3  3  3  3  3  3  3  3  2  2  2  4  5  7  8  9 11  6  7  6  6
PC1   N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N
P06                              1                 15                 7                 6                20
LP1   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0999999999999999999999999999999999999999
LC1   N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  X  X  X  X  X  X  X  X  X  X  X  X  X
CP1   0  0  0  0  0  0  0  0  0  0  0  0  0  1  5  1  1  1  1  1  1  1  1  1  0999999999999999999999999999999999999999
CC1   N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  X  X  X  X  X  X  X  X  X  X  X  X  X
POZ   1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0999999999999999999999999999999999999999
POS   3  2  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0999999999999999999999999999999999999999
TYP   R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  X  X  X  X  X  X  X  X  X  X  X  X  X
CLD  FW SC FW FW FW FW SC SC SC FW SC SC SC BK BK BK BK BK BK BK SC SC SC SC SC SC SC SC BK BK BK BK BK SC BK BK BK BK
CIG   8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8  8
CCG   8  8  8  8  6  8  6  8  8  8  6  6  8  6  6  7  8  6  7  7  8  8  8  8  8  8  8  6  6  6  6  6  8  8  8  6  6  6
VIS   7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7
CVS   7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7
OBV   N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N
```

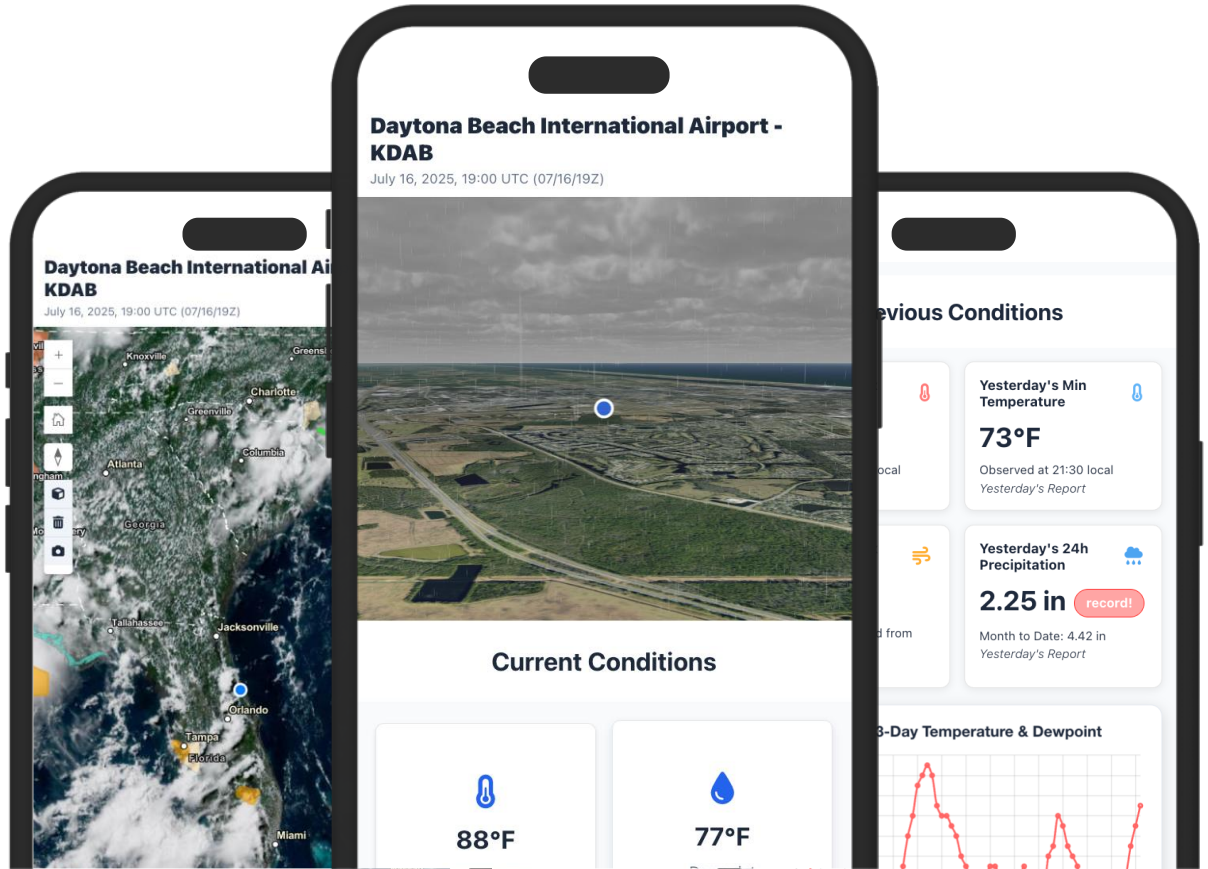
How can we visualize this weather story?

```
KDAB   NAM MOS GUIDANCE   10/07/2025  1200 UTC
DT /OCT   7/OCT   8               /OCT   9               /OCT  10
HR   18 21 00 03 06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 06 12
N/X                    71          87          72          85    74
TMP  84 81 77 76 74 73 73 84 85 83 79 77 75 73 73 83 84 81 78 78 76
DPT  73 72 72 70 71 70 70 70 70 71 71 72 71 70 71 70 70 70 69 71 71
CLD  BK BK BK SC BK BK SC SC SC SC BK SC SC BK BK BK BK OV OV OV OV
WDR  09 09 08 07 05 05 06 06 05 05 05 05 05 04 04 04 05 04 04 04 02
WSP  11 10 07 07 04 04 03 07 08 08 05 06 06 06 05 12 11 13 14 13 12
P06        20     2    13     5     4     1     3     9    14 28 53
P12                    13           7           4           24    67
Q06         0     0     0     0     0     0     0     0     0  0  3
Q12                    0           0           0           0     3
T06     26/ 0  3/ 0  0/ 0  0/ 1  5/ 0  4/ 0  0/ 0  7/ 0 17/ 2 18/ 1
T12           26/ 0        4/ 1        6/ 0       10/ 1    29/ 2
POZ   0  1  1  1  0  0  0  0  0  1  0  0  0  0  0  0  0  0  0  0  0
POS   0  0  0  0  1  1  1  1  0  0  1  1  1  1  1  0  0  0  0  0  1
TYP   R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R
SNW                    0                                   0       0
CIG   6  6  8  8  8  6  8  8  8  8  8  8  8  8  8  8  6  6  6  6  6
VIS   7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7
OBV   N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N
```

```
KDAB   GFSX MOS GUIDANCE  10/07/2025  1200 UTC
FHR  24  36| 48  60| 72  84| 96 108|120 132|144 156|168 180|192
     WED 08| THU 09| FRI 10| SAT 11| SUN 12| MON 13| TUE 14|WED CLIMO
N/X  73  87| 73  85| 76  81| 72  78| 65  80| 61  84| 63  84| 64 66 84
TMP  75  79| 75  79| 78  75| 74  72| 66  72| 63  74| 65  75| 65
DPT  73  74| 73  72| 73  70| 70  64| 63  64| 61  64| 63  66| 61
CLD  PC  PC| PC  PC| OV  OV| OV  OV| PC  CL| CL  CL| CL  CL| CL
WND   6  11|  7  15| 15  15| 15  20| 16  10|  4   8|  3  13|  8
P12  16  25| 14  30| 61  78| 57  30|  9   6|  5   4|  5  13|  9 18 20
P24      28|     40|     78|     65|     15|      9|     13|       29
Q12   0   0|  0   0|  3   5|  2   0|  0   0|  0   0|       |
Q24       0|      1|      5|      3|      0|      0|       |
T12   5   8|  4  24| 29  41| 24  15|  2   1|  2   1|  1   8|  3
T24       |  9    | 47    | 49    | 15    |  7    |  7    | 10
PZP   0   0|  1   0|  0   0|  2   1|  1   1|  1   1|  0   0|  1
PSN   0   0|  0   0|  0   1|  0   0|  0   0|  0   0|  0   0|  0
PRS   0   0|  0   0|  1   0|  0   0|  0   1|  0   1|  0   0|  0
TYP   R   R|  R   R|  R   R|  R   R|  R   R|  R   R|  R   R|  R
SNW       0|      0|      0|      0|      0|      0|       |
```

asosweather.com

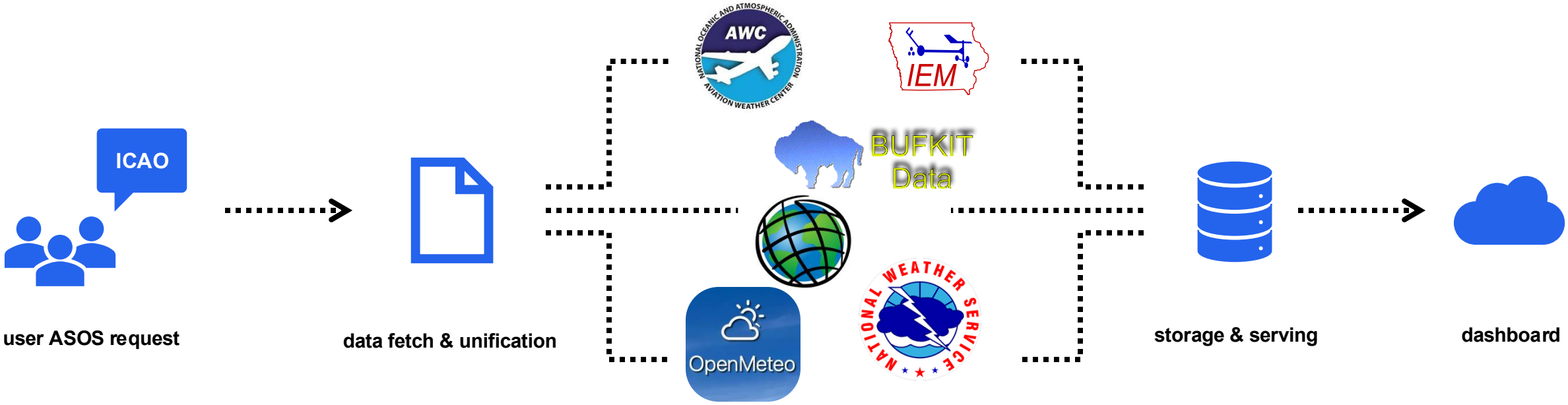
point forecasting made easy

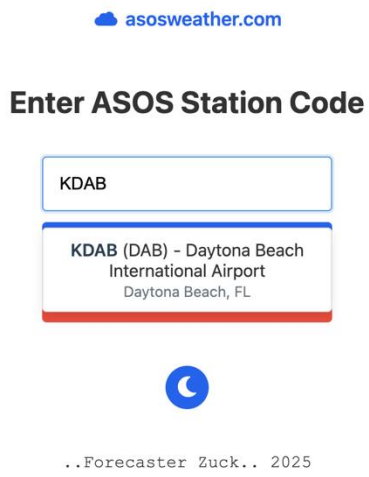


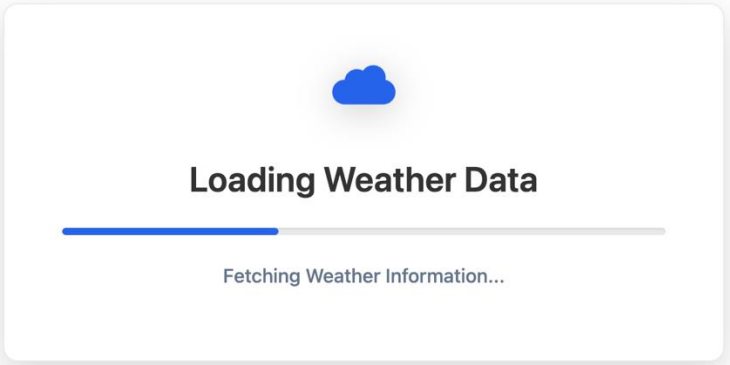
What is asosweather.com?

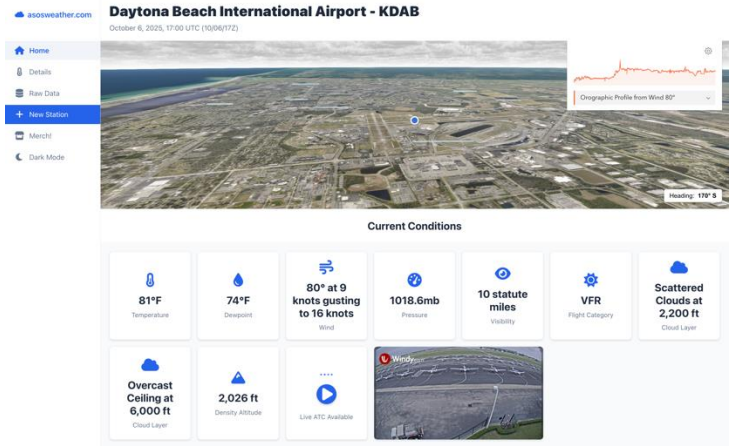
- Consolidated Space for Station-specific Data
- Enhanced Visualization of NOAA Raw Text Products
- Contextualized Spatial and Non-spatial Synoptic Data

How does asosweather.com work?


ICAO
AWC
IEM
BUFKIT
Data
OpenMeteo
NATIONAL WEATHER SERVICE
user ASOS request
data fetch & unification
storage & serving
dashboard
data sourcing, caching, and cleaning


asosweather.com
Enter ASOS Station Code
KDAB
KDAB (DAB) - Daytona Beach International Airport
Daytona Beach, FL
..Forecaster Zuck.. 2025

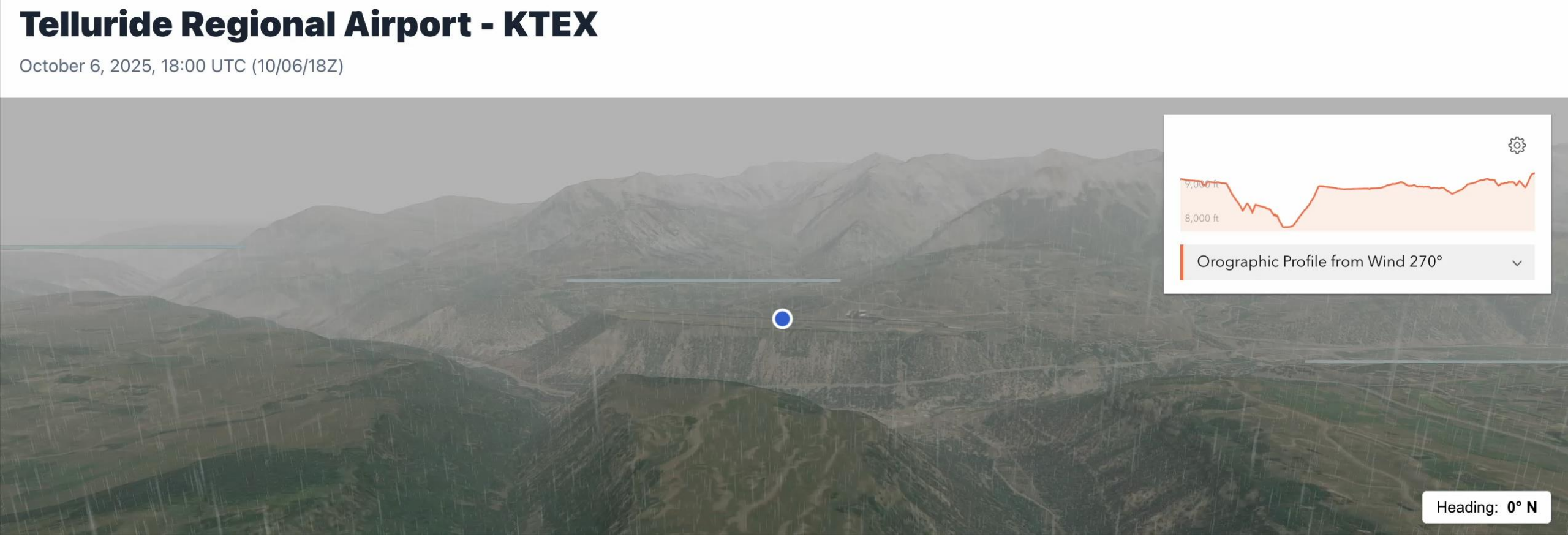

Loading Weather Data
Fetching Weather Information...


Daytona Beach International Airport - KDAB
Current Conditions
81°F
74°F
80° at 9 knots gusting to 16 knots
1018.6mb
10 statute miles
VFR
Scattered Clouds at 2,200 ft
Overcast Ceiling at 6,000 ft
2,026 ft

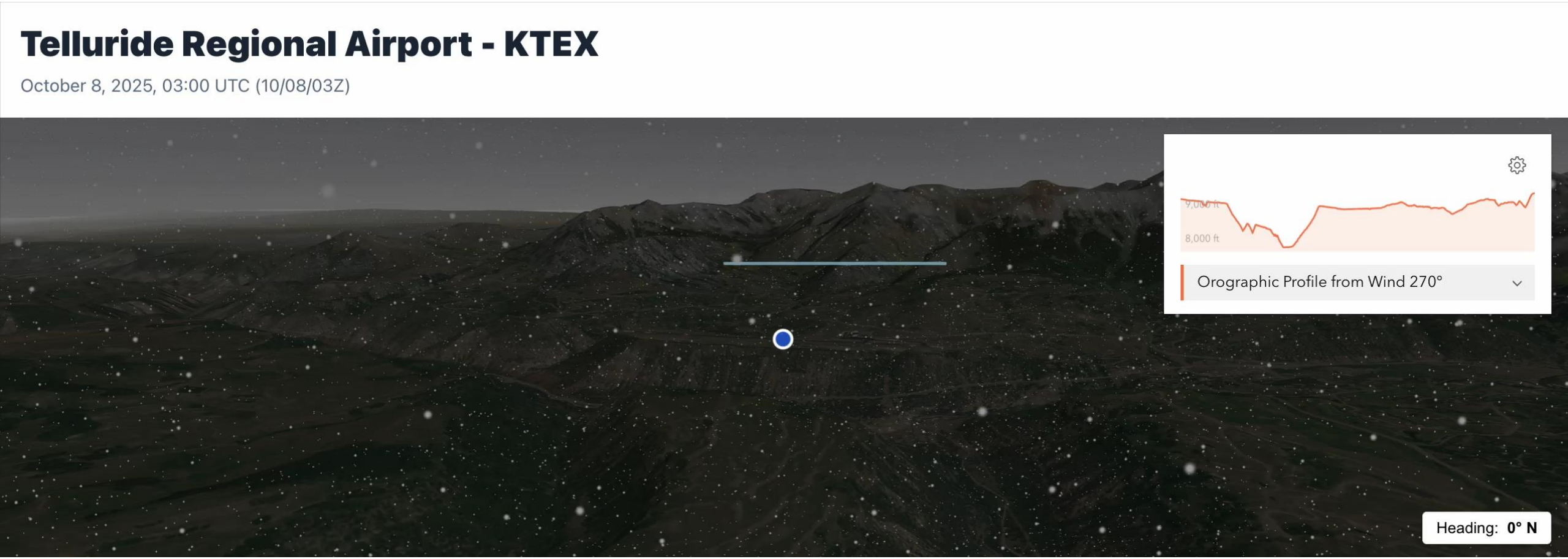
How does asosweather.com enhance METAR literacy?

lightning visualizations with flashing imagery

How does asosweather.com enhance METAR literacy?



How does asosweather.com enhance METAR literacy?

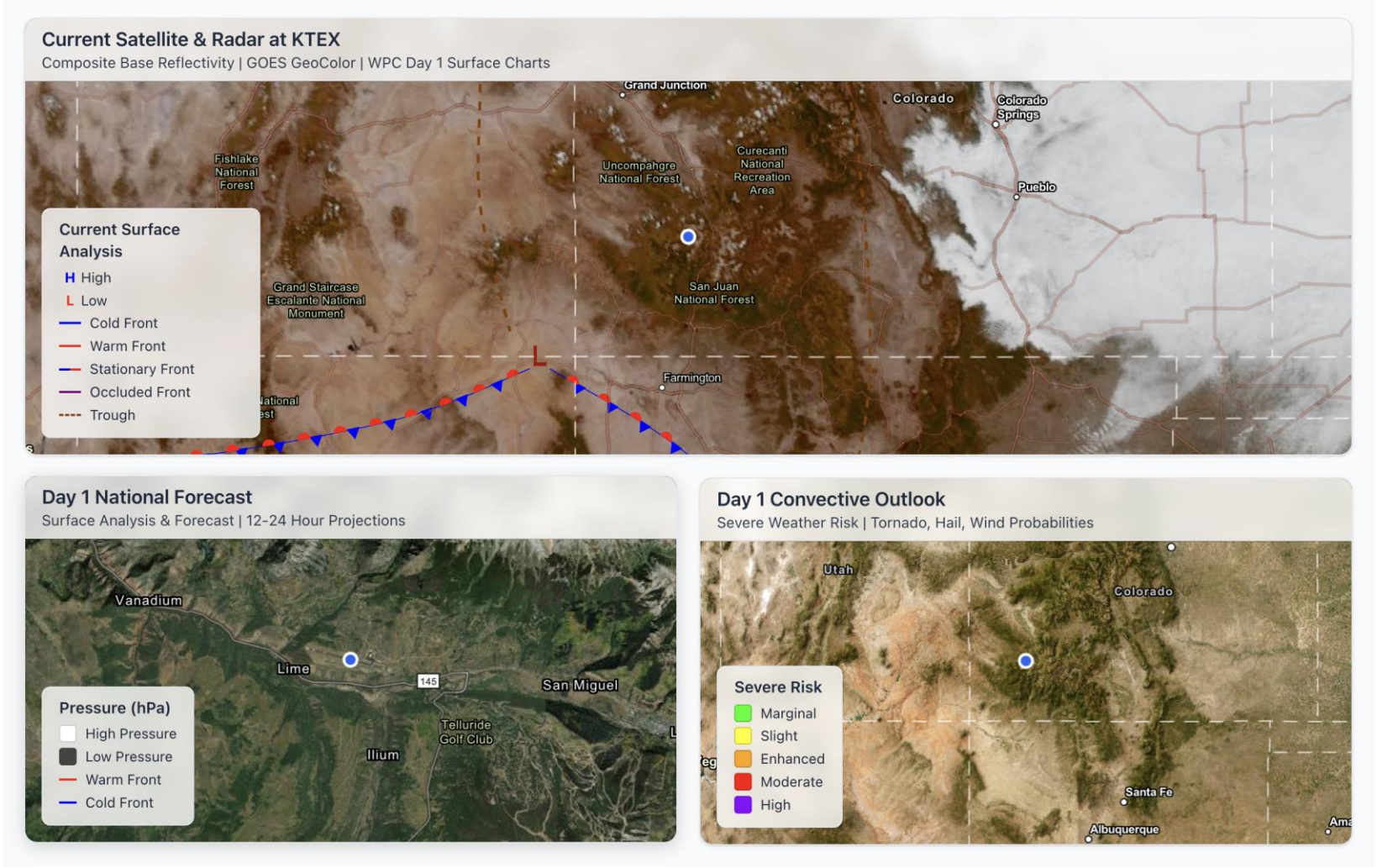


How does asosweather.com enhance METAR literacy?

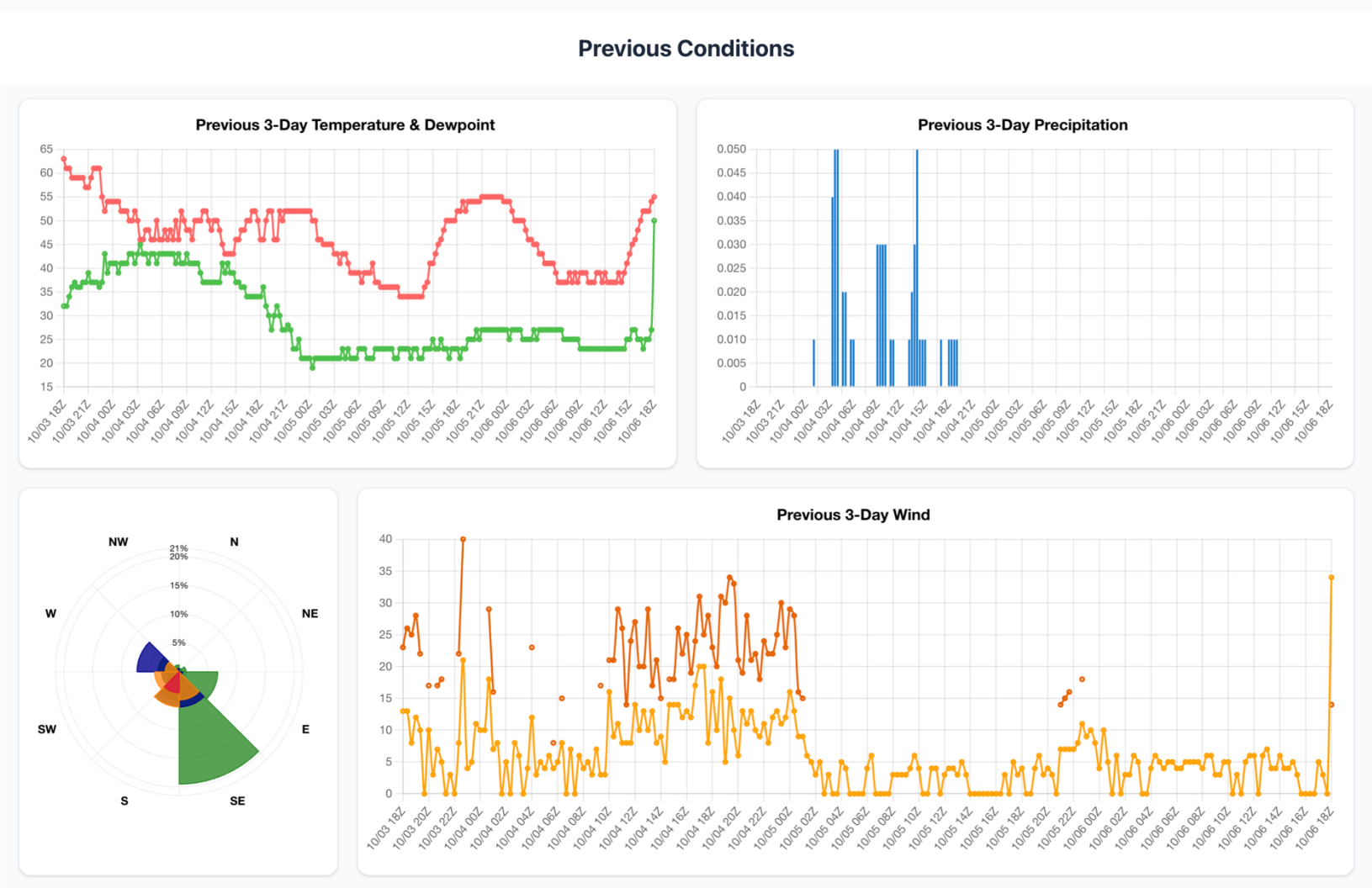
Current Conditions

55°F Temperature	50°F Dewpoint	270° at 34 knots Wind	Thunderstorm Heavy Rain and Mist Weather	7.00 statute miles Visibility	VFR Flight Category
Overcast Ceiling at 8,000 ft Cloud Layer	10,702 ft Density Altitude				

How does asosweather.com enhance METAR literacy?



How does asosweather.com enhance METAR literacy?



What does asosweather.com look Like?

What are some limitations of asosweather.com ?

What are some limitations of asosweather.com ?

- Imperfect Software Practices & Optimization
- Variables Vary in their Variations!
- Reliable CONUS, Semi-reliable PA/PR/Intl.

What does the future hold for asosweather.com ?

What does the future hold for asosweather.com ?

Pilot-specific dashboard (fly.asosweather.com)

More Products, Data Sources, & Visualizations

Cache/Fetch Optimization & Framework Upgrades

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Thank You FPAW!

This project has been supported by the Embry-Riddle Aeronautical University Office of Undergraduate Research.