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# 14 WS Operations / Data Use

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**Data Quality Team Lead**

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# Vision & Mission



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## VISION

Provider of unparalleled earth decision-enabling products, allowing command authorities to anticipate and simulate environmental impacts on aspects of military operations worldwide



## MISSION

Rapidly disseminate customized applied climatological and historical weather information to maximize combat effectiveness of DoD personnel and weapon systems, through expert receipt, quality control, storage, and tailoring of earth environmental data



# 14WS Products



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- n **Whatever decision-makers in the DoD request, we will try to accommodate as best we can**
  - n **We will also try to anticipate needs**
  - n **We constantly seek out new ways to improve ‘old’ products**
- n **Typical products include:**
  - n **Standard climo: available on 14WS website with instant access for established locations**
  - n **Forecast tools: short range and long range products**
  - n **Tailored climo: “customer” driven, specific data requests**
    - n **Can be reoccurring or one-time deals**
  - n **Modeled data: web-based, very course resolution (for now)**
- n **Data used is “operationally sound”**
  - n **Limited levels of QC: Very bad data is removed, but minor errors get through**

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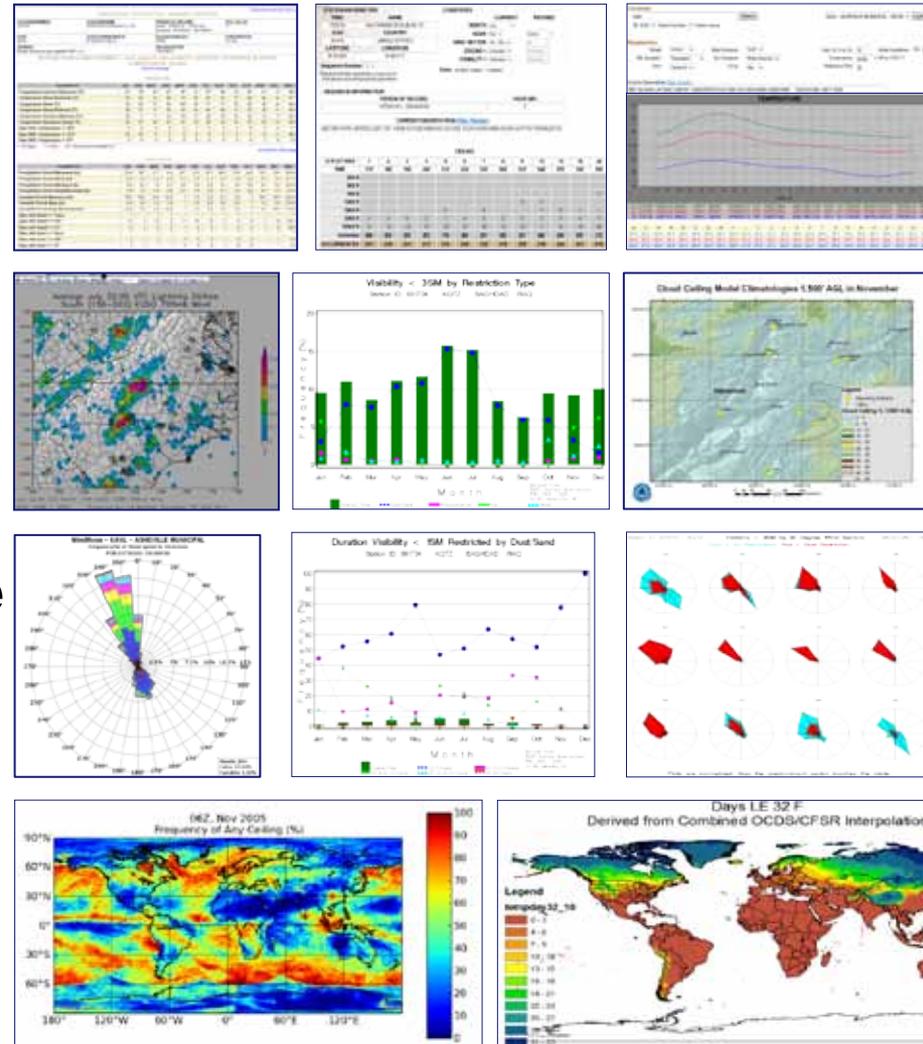


# Standard Products



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- n **Standard Products:**
  - n wind roses, dust trends, engineering weather, summaries, CCTAP, visibility restrictions, modcurves, WSCC, lightning, LRF
- n **Characterize point data in terms of historical occurrence**
- n **Spatially-based graphical climo in development**
  - n Expands climo availability
  - n Interactive





# Tailored Products



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## n Tailored Products:

n Examples: dust trends (reoccurring), temperature bulls-eyes, determining the optimal site for stationing a certain plane, June 23<sup>rd</sup> 2011 wind data

n Utilize arcGIS, Excel, SQL/SAS

## n Focus mostly on unstable regions of globe

n Regions usually have limited climo data

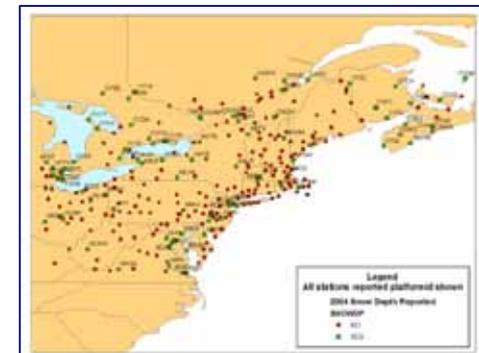
## n Can include upper air, lightning, aircraft obs, surface, GFS, analyzed

n Can be broken down by anomalous events (i.e. ENSO years)

## n Turn time typically 1-3 days (can be more for very large requests)



Month	10-Day Period	Maximum Temperature Hours (UTC)			
		MAX HR 5	MAX HR 6	MAX HR 7	MAX HR 8
MAR	1 to 10	73	76	79	84
MAR	11 to 20	77	81	82	86
MAR	21 to EOM	78	84	90	93
APR	1 to 10	73	79	84	88
APR	11 to 20	84	88	93	99
APR	21 to EOM	84	93	99	102
MAY	1 to 10	88	93	97	102
MAY	11 to 20	92	95	100	106
MAY	21 to EOM	93	99	102	108
JUN	1 to 10	100	106	109	113
JUN	11 to 20	100	106	113	117
JUN	21 to EOM	100	106	109	113
JUL	1 to 10	100	104	111	113
JUL	11 to 20	100	106	113	118
JUL	21 to EOM	105	109	114	117
AUG	1 to 10	102	108	115	120
AUG	11 to 20	100	108	113	117
AUG	21 to EOM	99	106	109	115





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# Sources Used in Products



- n **Most data kept in Oracle database, other data as flat files, tapes, cds**
- n **In Situ (our #1 source and focus)**
  - n **Upper air**
  - n **Surface (includes ship and mobile obs)**
    - n **Actual obs**
    - n **Summarized data (GHCN)**
- n **Spatial/analysis/gridded/forecast data**
  - n **CFSR (state of the art reanalysis data)**
  - n **Legates, GPCP, LIS--Land Information System (AGRMET)**
  - n **GFS**
  - n **Climate Forecast Models (used by LRF; data not stored in our database)**
- n **Lightning**
  - n **Mainly US**
- n **Space launch tower data**
- n **Other-we will find what we can for new regions of conflict**

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# *Quality Control of the Data*



- n **Mostly on surface data**
- n **Basic algorithms to capture egregiously bad data**
  - n **Good: Temperature, Dew Point, Pressures**
  - n **Okay: Winds, Present Weather (mainly precip type)**
  - n **Poor: Clouds, Visibility**
  - n **None: Precipitation totals\*, Snowfall totals**
- n **Many sites will get site specific statistical checks**
  - n **Most of these will get even more scrupulous QC applied**
    - n **Primed for addition to our “authoritative” JMCLIM database**
- n **QC upon request (esp. for tailored products)**
  - n **Frequently apply sweeping fixes upon discovery**

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# JMCLIM Database



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§ Our 'authoritative' database of summarized climatology data

§ Derived from surface obs, GHCN, summary of the day, other foreign precip/snow sources (as a last resort)

§ Data is more reliable and raw data can be used for other products

§ More QC and statistical processes flag/remove more questionable surface data used for products

§ Database currently populated with ~1200 sites

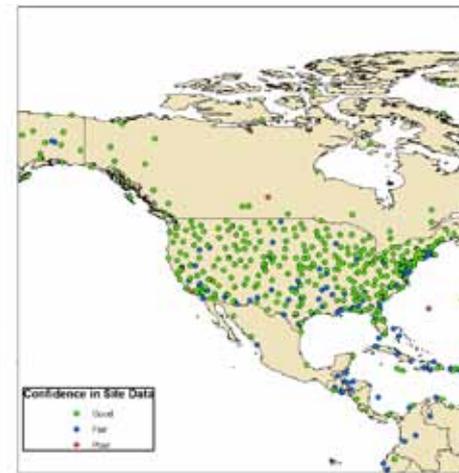
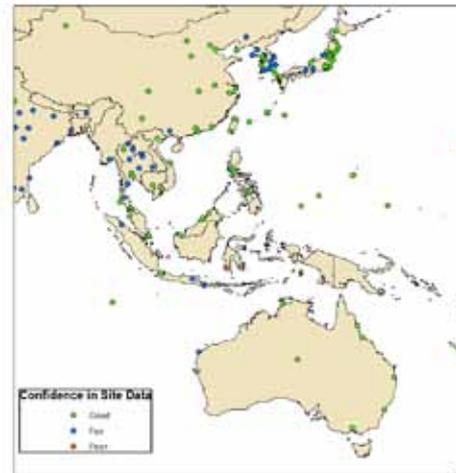
§ 800 good confidence, 300 medium confidence, <100 low confidence sites

§ 1000's of additional sites can be added, though most of this potential is in the US or Europe

§ Priority given to new sites in data sparse areas and to sites in regions of unrest

§ A good vs. fair vs. bad site is categorized by quality and quantity of data

§ New process developed to numerically quantify confidence in data used



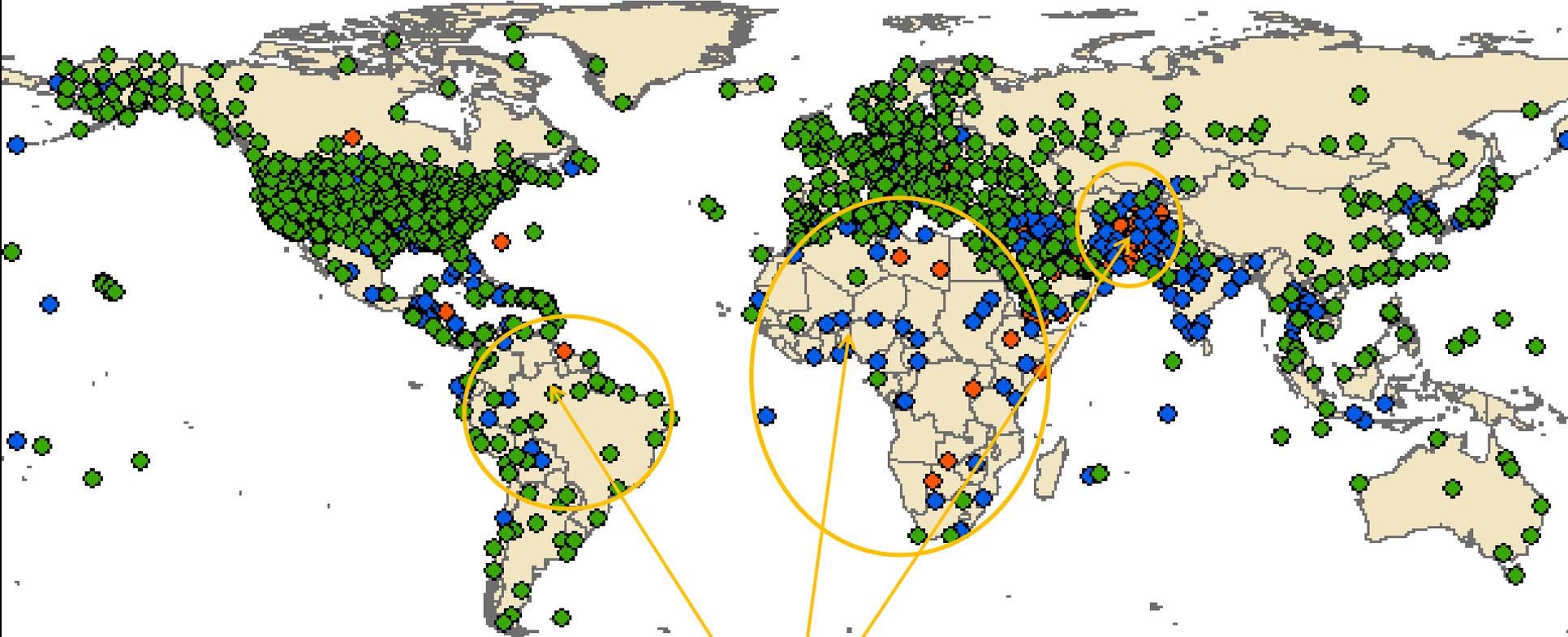
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# JMCLIM Sites



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**Confidence in Site Data**

- Good
- Fair
- Poor

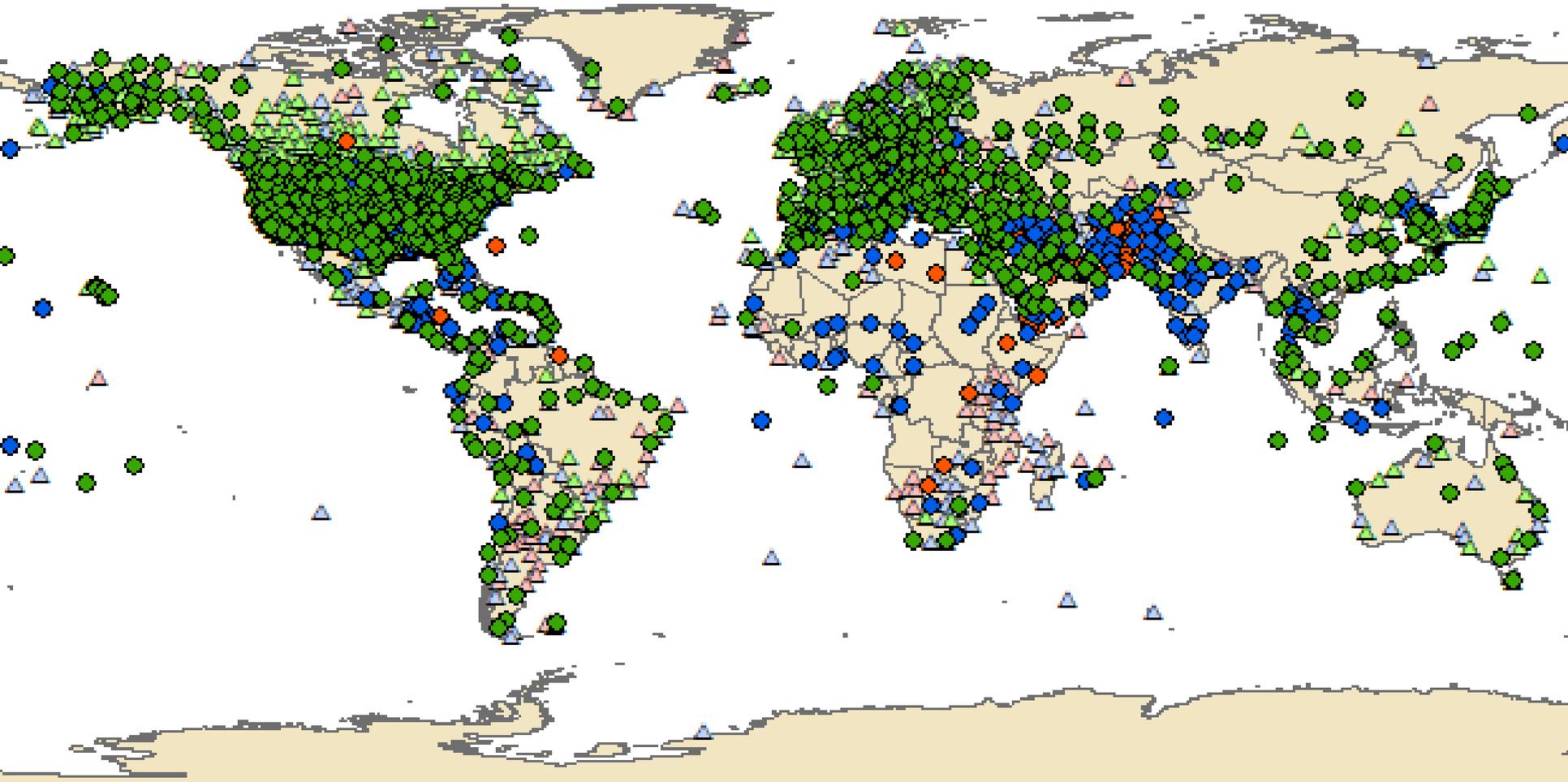
Data sparse regions tend to be where the DoD focuses most of its interest (3<sup>rd</sup> world = conflict and poverty = no money for obs). Many of the blue/orange dots in Central Asia are NATO/US military sites with less than 10 years of data. These data sparse areas tend to have poor quality data in obs as well.

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# Potential JMCLIM Sites



Triangles show potential new sites that can be added to JMCLIM database (green-good, light blue-fair, light red-poor)  
Though not visible through the already created sites, most potential is in already well-represented or low priority areas.

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# *Confidence in Parameters*



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- n **Temperature: good**
- n **Dew point: good**
- n **Pressure fields: good**
- n **Wind direction and speed: good**
- n **Weather occurrence type: okay**
- n **Visibility and ceiling levels: medium to okay**
- n **Cloud cover and layers: medium**
- n **Weather occurrence frequency: medium (good for manual sites, low for automated sites)**
- n **Precipitation and snowfall amounts: low (good if summary of day or GHCN used)**



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# *Desired Data*



- n **Data for limited data areas like Africa and Central Asia**
- n **Mesonet data, esp. foreign**
- n **Global lightning data (outside US and Europe)**
- n **Spherics Data**
- n **With ever increasing use of automated obs, a better way to quantify error/differences to manual obs (i.e., sensors misinterpreting dust vs smoke vs haze)**
  - n **Stair-step pattern very common issue seen in sites that adopt automated platforms**



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# Takeaway/Overview



- n **The 14WS strives for the capability to produce timely and relevant climate-based products for anywhere at the world**
  - n **Try to utilize climo in the planning phase as soon as possible to prevent wasting taxpayer money and lives positioning assets in places more prone to bad weather**
- n **We greatly desire sound data sources for areas prone to military operations (includes humanitarian efforts)**
- n **Certainly open to better QC techniques, esp. for precip/snowfall (that can be automated)**
  - n **Experimenting with spatially-based QC**

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## Contact Information

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