
European Meteorological Society Annual Meeting 2018

WMO Competency Framework – what does it mean for the changing role of Weather Forecasters?

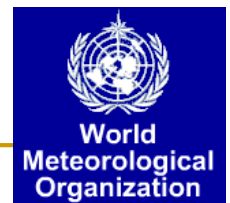
Gerald Fleming
Chair, OPAG on Public Weather Services, WMO

WMO Competency Framework



Developed to underpin training and continuing professional development of all Meteorologists

- Basic Document – Public Weather Service or “Bench” Forecaster
- Subsidiary, or specialist competencies
 - Weather Broadcasters and Communicators / Media Liaison
 - PWS Disaster Prevention and Mitigation Advisor
 - Innovation and Improvement in Meteorological and Hydrological services and products.



Competency Framework for Weather Forecasters

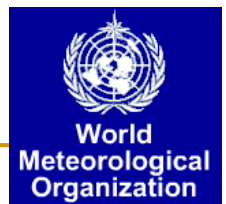


- What is a Competency?

“The ability of an individual to do their job properly”

“The ability to do something successfully and efficiently”

“All the related knowledge, skills, behaviours and attributes that form a person’s job”



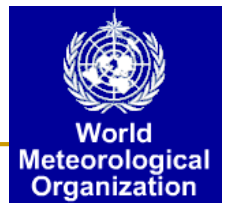
Competency Framework for Weather Forecasters



- A Competency is about more than just knowledge!

It is about the application of knowledge to the tasks required in carrying out one's job.

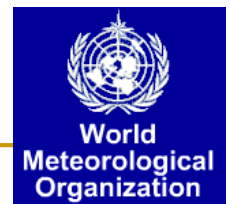
Related to behaviour – personality – people skills – ability – context.



Competency Framework for Weather Forecasters



- Competency Framework will be a “WMO Recommended Practice”
- Not obligatory, but stronger than just “Guidance”
- WMO is the regulatory body for all of world meteorology, so these Competency Frameworks should be applicable across both the public and private sectors
- Considerable work yet to be done within WMO
 - Developing underlying guidance material
 - Incorporating these ideas into training curricula



Competency Framework for Weather Forecasters

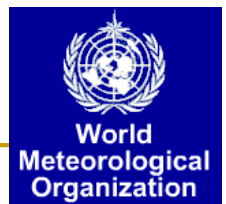


- Let's look at the basic PWS Forecaster Competency

Are we talking here only about Meteorologists? No!

In some countries the training to be a forecaster does not necessarily encompass degree-level training in Meteorology.

Should have completed the Basic Instruction Package in Meteorology, or an equivalent.

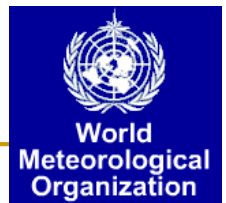


Competency Framework for Weather Forecasters



- “taking into consideration”
 - The nationally-defined PWS areas of responsibility;
 - Meteorological and hydrological impacts on society;
 - Meteorological and hydrological user requirements, local procedures and priorities.

These can be thought of as “filters” for specific contexts. Not all of the competencies will apply to each specific context.



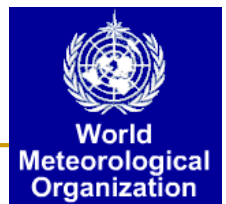
First top-level Competency



- **Analyse and monitor continually the evolving meteorological and/or hydrological situation**

- Everything starts with observation

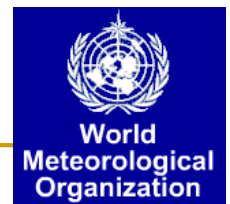
- Develop an understanding of what is happening – and why
 - Analyse and interpret data....
 - Monitor weather parameters and validate current forecasts....
 - Evaluate the need for amendments / updates....



Background knowledge and skills



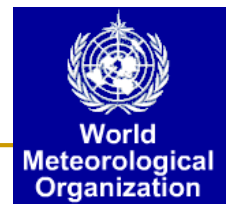
- **Analyse and monitor continually the evolving meteorological and/or hydrological situation**
 - Understanding of synoptic, dynamical and physical meteorology
 - Application of theory and methods
 - Visualise / conceptualise in multiple dimensions
 - Influence of topography, land/sea boundaries etc
 - Proper interpretation of observation data



Second top-level Competency



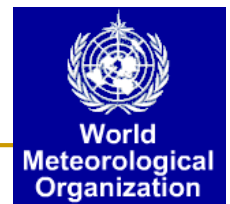
- **Forecast meteorological and hydrological phenomena and parameters**
- Moving into the future ... Implies an ability to understand and correctly interpret NWP output
- Again needs an understanding of what will happen, and why
 - Forecast weather phenomena.....
 - Ensure that forecasts follow appropriate formats, protocols....
 - Spatial consistency....



Background knowledge and skills



- **Forecast meteorological and hydrological phenomena and parameters**
 - Diagnostic and prognostic skills
 - Knowledge of NWP methods, including EPS
 - Knowledge of NWP strengths / weaknesses
 - Make reasoned estimate of the forecast; realise other evolutions
 - Understand the likely impacts



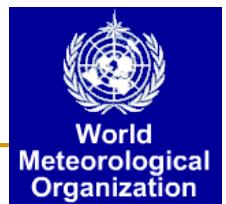
Third top-level Competency



- **Warn of hazardous weather**

- Fundamental task of all NMHSs

- Warnings need to be timely, allied to thresholds.
 - Forecast hazardous weather phenomena.....
 - Ensure that warnings follow appropriate formats, protocols....
 - Spatial and temporal consistency....

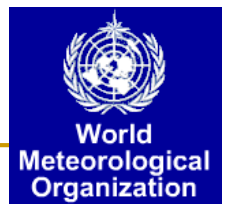


Background knowledge and skills



■ Warn of hazardous weather

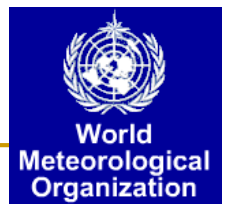
- ❑ Knowledge of dissemination and production systems
- ❑ Knowledge policies, procedures and criteria for warnings
- ❑ Understand the likely impacts



Fourth top-level Competency



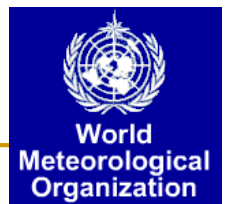
- **Communicate meteorological and hydrological information to internal and external users**
- Make sure that all communication protocols are adhered to
- Can explain clearly, deal with uncertainties, deliver briefings etc



Background knowledge and skills



- **Communicate meteorological and hydrological information to internal and external users**
 - Presentation skills
 - Knowledge of appropriate protocols
 - Awareness of specific user needs, and how they use weather information
 - Awareness of the application of weather and climate data to human activities



Fifth top-level Competency



- **Ensure the quality of meteorological and hydrological information and services**
 - ❑ Can handle 24/7 rostered duties
 - ❑ Can self-manage workload
 - ❑ Good team-worker
 - ❑ Accepts change readily
 - ❑ Learn from experience – continually try to improve

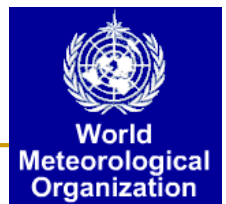
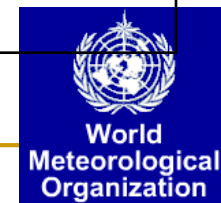


Table of Top Level Competencies



Personnel engaged in operational forecasting	Weather broadcasters and communicators	PWS Advisers supporting disaster prevention and mitigation and other user activities.	Persons engaged in the development and delivery of meteorological and hydrological products and services
Analyse and monitor continually the evolving meteorological and/or hydrological situation.	Maintain awareness of the evolving meteorological and/or hydrological situation, updated forecasts and warnings, and impacts of anticipated conditions.	Monitor continually the evolving meteorological and/or hydrological situation, updated forecasts and warnings, and impacts of anticipated conditions.	Maintain awareness of developments in technology, and science which facilitate the development and improvement of products and services to meet user requirements.
Forecast meteorological and hydrological phenomena and parameters.	Assemble meteorological and hydrological information that meet user needs for communication and delivery.	Develop and adopt procedures and services to meet user needs and facilitate impact assessments.	Develop applications, products and services that meet user requirements.
Warn of hazardous meteorological and hydrological phenomena.		Develop and manage relationships with Disaster Prevention Mitigation users and other stakeholders.	Develop and manage relationships with users and other stakeholders.
Communicate meteorological and hydrological information and potential impacts to internal and external users.	Communicate meteorological and hydrological information and potential impacts via broadcast and other media.	Communicate meteorological and hydrological information and potential impacts to internal and external users and engage in outreach activities.	
Ensure the quality of meteorological and hydrological information and services.	Ensure the quality of meteorological and hydrological information and services.	Ensure the quality of meteorological and hydrological information and services.	Ensure the quality of meteorological and hydrological information and services.



Partnerships and Collaboration



- Forecasters now need to work in partnership with users, especially other government agencies and stakeholders (emergency response, mapping agencies, transport, public, etc).
- Data sharing among different agencies and departments will be vital (demographic, GIS and mapping, economic etc).
- Understanding of Impacts will come partly from experience, partly from improved modelling of vulnerabilities and exposure.

Partnerships and Collaboration

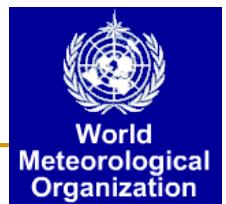


- Implication – Forecasters need to know something of the business and the concerns of their users.
- Forecasters need to be able to anticipate the possible impacts of different weather scenarios on the business of their users.
- Why can the users not do this for themselves?
- A Fundamental Problem – often the users do not know what they want!

Future shape of forecasting



- ❑ A growing demand for advice, home and abroad, as impacts from extreme weather events become more prevalent as vulnerabilities increase and climate warms
- ❑ An appreciation that the demand for more customer relevant, accurate and consistent forecasts across all timescales
- ❑ A shift towards impact, multi partner, impact-based services to aid better decision making, globally

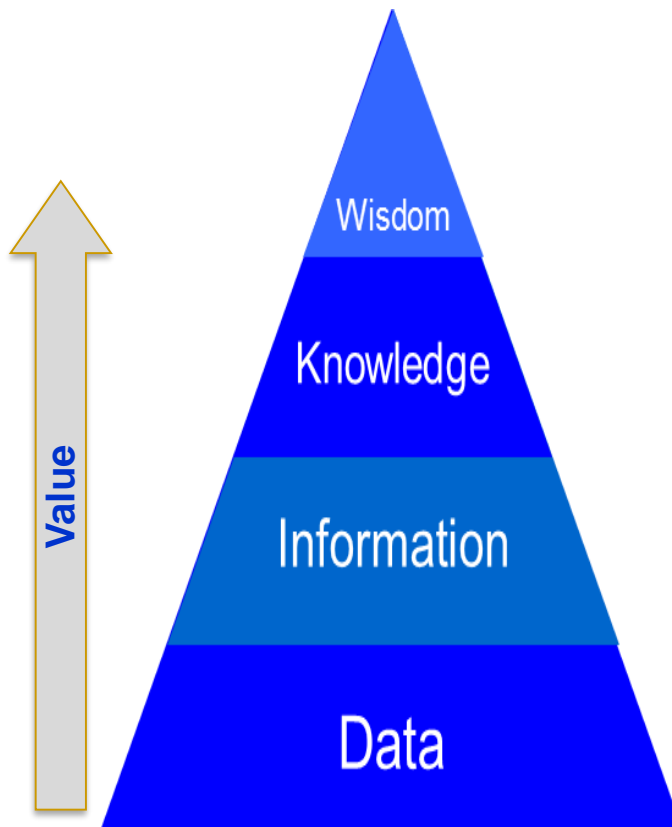


Future Role of the Forecaster

- If the Forecaster does not do this work – who will?
- Forecasters now have access to information about possible evolutions of weather over the next 10-14 days.
- Their ability to understand and contextualise this information will be key to their success.
- Users will also need training!
 - Especially Emergency Management



The information value pyramid... towards higher value



- Applied wisdom-advice → insight, environmental intelligence
- Science, numerical models, reports, national accounts, assessments, policies
- Analyses, forecasts, warnings, outlooks; climate record; discovery metadata
- Environmental observations: land, oceans, water, atmosphere, space

Future Role of the Forecaster



- How best to arrange this in practice?
- Specialised Meteorologists guiding “bench” forecasters?

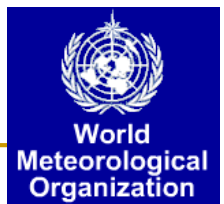
OR

- “Bench” forecasters acquiring specialisations?

Thrusts for the Role of the Forecaster



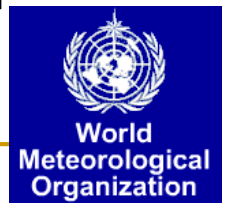
- Forecast production
 - moving to oversight and intervention in a decision making system.
- Client oriented
 - moving to the seamless integration of client relationships within the full forecast system.
- Science and Development
 - moving to the seamless application of science results to meet client requirements...
 - But science should not be subdued by the Service functions
- Learning
 - moving to forecasters with appropriate skills in a system of continuous skill renewal
- Organization
 - moving to an adaptively managed system to minimize societal risks to high impact weather.



In Summary.....



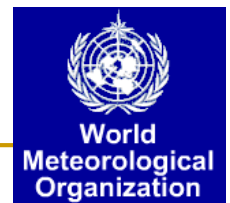
- Next decade will see a fundamental re-think of how meteorological and oceanographic enterprise operate globally and nationally
- Moving further from the 'Man against Machine ' paradigm to embrace 'Man leveraging Machine'...
 - Emergence of AI (e.g. IBM Watson and the likes)
- Moving toward seamless multi-scale socio-environmental intelligence ... surveillance, prediction, analytics
- Emergence of the role of the private sector ---- from competitors to collaborators
- Role of academia in R&D and in preparing our current and future workforce...



Conclusion



- What does it mean for the future?
 - Automation will continue to increase
 - Expertise of professional meteorologists will continue to be required where humans add value
 - high impact weather, support to emergency, interpretation, research and development , etc....
 - New products and services will need to be developed
- This will change the way we operate (24/7 operations)
 - The mode of operations has to change....





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Thank you for your attention