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# Introduction to the Hydrology Domain Working Group Environmental Data Summit

105th OGC Technical Committee  
Palmerston North, New Zealand

Tony Boston

6 December 2017

# Agenda

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- Hydrology Domain Working Group
  - Purpose
  - History
  - Standards
  - Adoption

# Hydrology Domain Working Group



- The Hydrology Domain Working Group is a Joint Working Group of the World Meteorological Organisation (WMO) and the OGC
- The purpose of the Hydrology DWG is to provide a venue and mechanism for seeking technical and institutional solutions to the challenge of **describing and exchanging data about the state and location of water resources, both above and below the ground surface**. The path to adoption will be through OGC papers and standards, advanced to ISO where appropriate, and also through the World Meteorological Organization's (WMO) and its Commission for Hydrology (CHy) and Information Systems (WIS) activities.

# The World Meteorological Organization (WMO)



‘... the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting **distribution of water resources**’

‘... facilitates the free and unrestricted exchange of data and information, products and services in real- or near-real time ...’

# International Standardization for Water Data



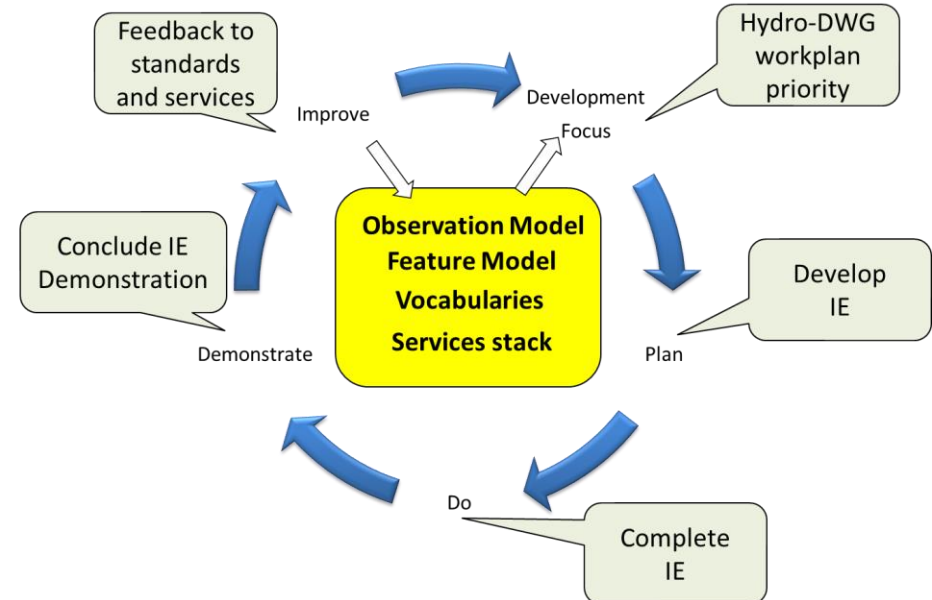
- **Hydrology Domain Working Group**

- standards for water data: **WaterML 2.0 suite**
- organizing Interoperability Experiments (IEs) focused on different sub-domains of water

- Co-chairs:

- Ilya Zaslavsky (USA)
- Tony Boston (Australia)
- Silvano Pecora (Italy)

## Iterative Development



# HydroDWG early history

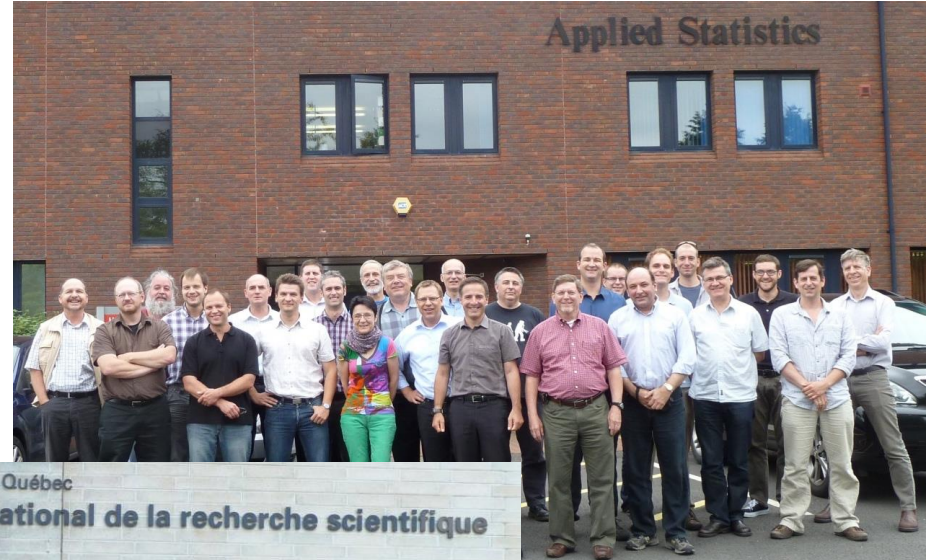


- Motivation: “There are currently no standards for data exchange formats for hydrological data” 2008 edition of *WMO Guide to Hydrological Practices*
- Sept 2008 (Atlanta) - First adhoc meeting of HydroDWG
- Early 2009 – WaterML2: Part 1 development commenced
  - CSIRO and CUAHSI leads
- March 2009 (Athens) – TC agrees to HydroDWG charter
  - Presentations by EEA, INSPIRE, WMO, GRDC, CUAHSI, CSIRO
- June 2009 (Boston) – First official HydroDWG meeting
  - Ilya Zaslavsky elected as co-chair
- Late 2009 – MoU signed between WMO and OGC
  - David Lemon and Ulrich Looser WMO nominated co-chairs

# HydroDWG workshops



- Annual face to face workshops in addition to TC meetings



# HydroDWG outputs

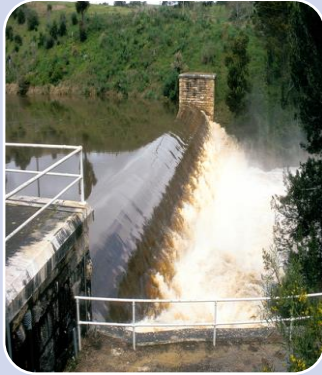
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- Forum for showcasing activities in the water and related domains
- Numerous Interoperability Experiments (Groundwater, Surface Water, Water Quality, Linked Data...)
- Discussion papers, engineering reports, draft and published OGC standards
- Participation in cross-domain projects (AIP's, OWS's, CHISP (Climatology-Hydrology Information Sharing Pilot)...
- WaterML2 suite of hydrologic information standards
- Sensor Observation Service 2.0 (SOS2) Hydrology Profile



# WaterML2 standards



Part 1 –  
Timeseries

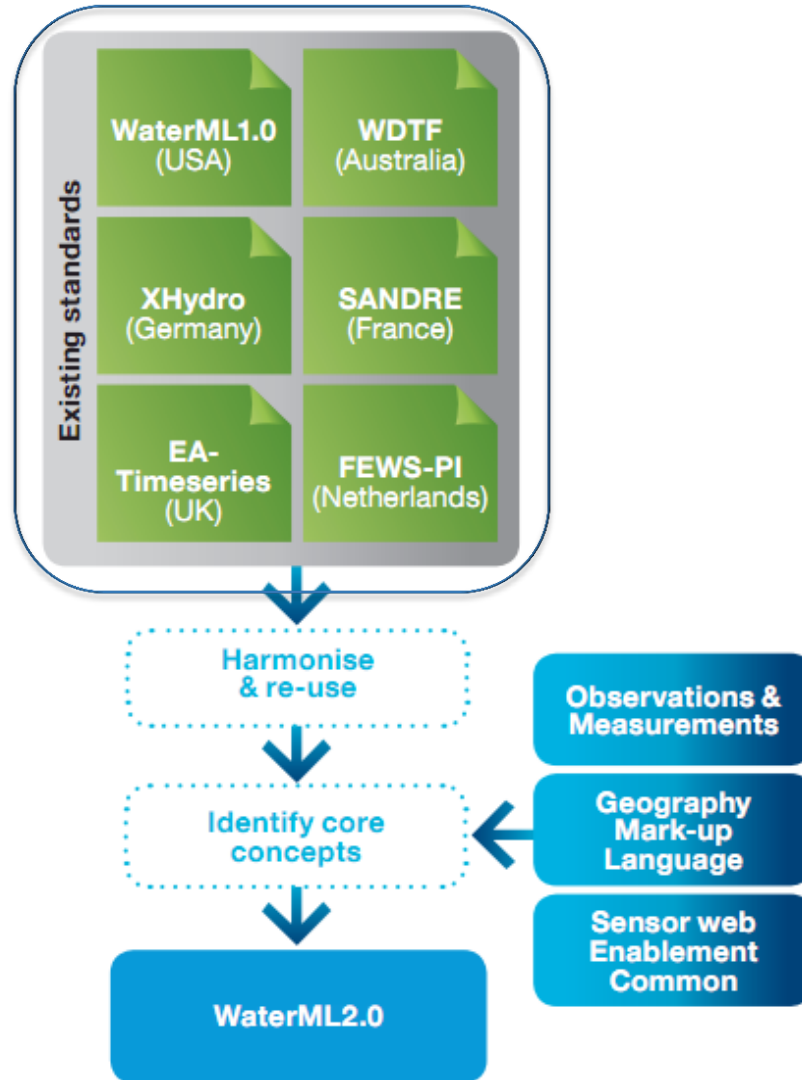
Part 2 –  
Ratings,  
Gaugings and  
Sections

Part 3 –  
Surface  
Hydrology  
Features

Part 4 –  
Groundwater  
Features

Part 5 –  
Water  
Quality  
Observation  
(best  
practice)

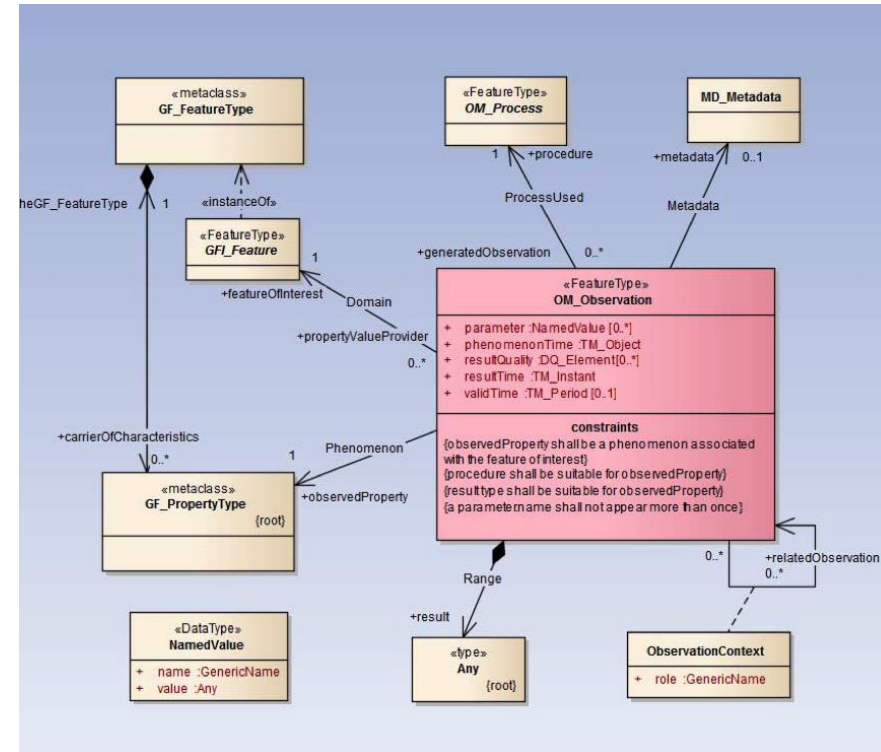
# WaterML2: Part 1 – Timeseries



# WaterML2: Part 1 – Timeseries



- Profile of O&M, reusing ISO and OGC standards
- UML model
- XML Schema (GML compliant)
- Specification document
  - Requirements
  - Conformance classes
  - Conformance tests
- XML Schematron rules
- Vocabulary definitions
  - Only a subset relating to time series



# Adoption

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- WMO Commission for Hydrology 15<sup>th</sup> session meeting in Dec 2016 formally adopted WaterML2 standards
- The WMO Hydrological Observing System will use WaterML2 standards for encoding and exchange of hydrological data between countries around the world
- Government agencies in North America, Europe, Australia, New Zealand etc have adopted WaterML2 standards
- Major vendors of Hydrologic Information Systems are supporting WaterML2 standards

# Welcome to the Hydrology Domain Working Group

## Overview

The ability to easily exchange water information in a timely and useful fashion is becoming increasingly important. Water information in general, is both highly spatial and highly temporal in nature. Water information is also an exemplar of the kinds of environmental information that is required to be shared across organizational and jurisdictional boundaries, which is facilitated by OGC's interoperability standards.

- Open public forum, email list and wiki
- New members always welcome!
- Contact: [tony.boston@anu.edu.au](mailto:tony.boston@anu.edu.au)