AIM 2014+
Alpine Space in Movement

Brainstorming Seminar for Stakeholders

22nd November 2013 – Vienna (Austria)

arpav
Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto

Matteo CESCA
ARPAV – Alp Water Scarce
Project Partner 11

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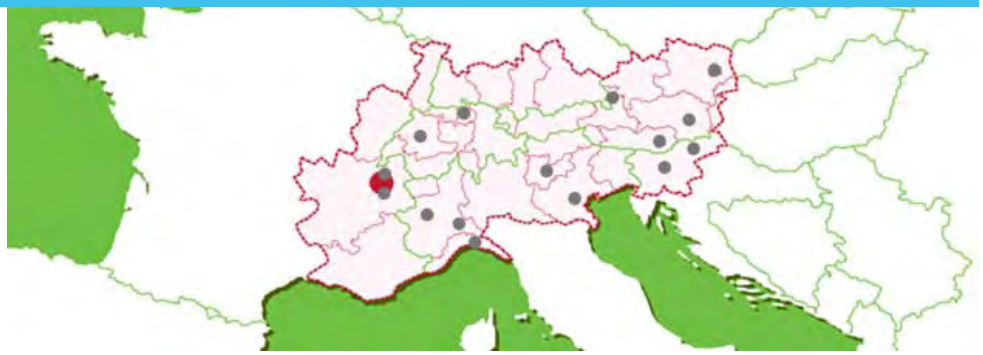
Alp-Water-Scarce

Water Management Strategies against Water Scarcity in the Alps



Project Participants

1 Société d'Economie Alpestre Haute-Savoie (F)

2 Conseil Général de la Savoie (F)

3 Amt der Kärntner Landesregierung, Abteilung 15 und 18 (AT)

4 Amt der Steiermärkischen Landesregierung; Fachabteilung 19A, Wasserwirtschaftliche Planung und Siedlungswasserwirtschaft (AT)

5 Paris Lodron Universität Salzburg (PLUS), Zentrum für Geoinformatik (Z_GIS) (AT)

6 Bundesanstalt für Agrarwirtschaft (AT)

7 GAL Appennino Genovese (IT)

8 Provincia di Alessandria (IT)

9 Provincia Autonoma di Trento – Dipartimento Urbanistica e Ambiente (IT)

10 Uncem Delegazione Piemontese (IT)

11 Agenzia Regionale per la Prevenzione e Protezione dell'Ambiente (IT) del Veneto – Dipartimento Regionale per la Sicurezza del Territorio (IT)

12 Geološki Zavod Slovenije (SI)

13 Nacionalni Inštitut za Biologijo; Oddelek za raziskovanje sladkovodnih in kopenskih ekosistemov (SI)

14 Kmetijsko gozdarska zbornica Slovenije; Kmetijsko gozdarski zavod Maribor (SI)

15 Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz (CH)

16 Bundesamt für Umwelt BAFU; Eidg. Departement für Umwelt, Verkehr, Energie und Kommunikation UVEK (CH)

Lead Partner
Institut de la Montagne, Université de Savoie (F)

Project duration
01/10/2008 - 30/09/2011

Partnership:
17 Partners
15 Observers

Total eligible costs:
3.990.903 €

5 4 3 3 2

Alp-Water-Scarce

Water Management Strategies against Water Scarcity in the Alps

Main challenges of the project **against water scarcity**:

create local Early Warning System

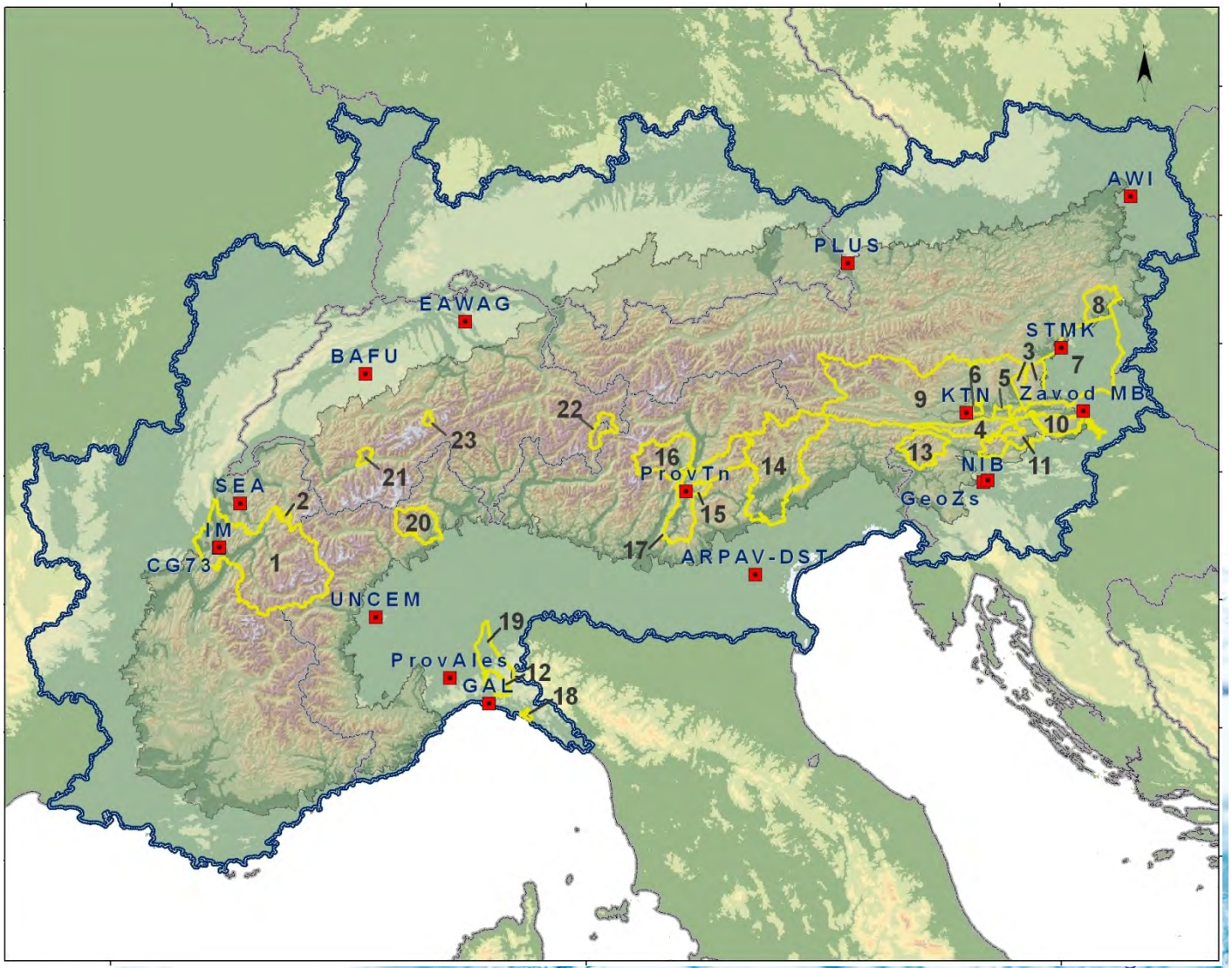
Water Management Strategies to support decision making

develop transnational concepts of water management

23 pilot areas located in France, Austria, Italy, Slovenia and Switzerland

AWS – Partner distribution and pilot case studies location

1) Savoy (FR)
2) Upper Arly River Basin (FR)
3) Koralpe (AT)
4) Karawanken (AT)
5) Jauntal (AT)
6) Lower Gurktal (AT)
7) Steirisches Becken (AT)
8) Steirisches Randgebirge – Wechsel (AT)
9) Entire Land Kärnten (AT)
10) Pohorje with Dravsko (SI)
11) Ptujsko polje (SI)
12) Scrivia River Basin (IT)
13) Julian Alps (SI)
14) Piave (IT)
15) Fersina (IT)
16) Noce (IT)
17) Adige (IT)
18) Entella river basin (IT)
19) Scrivia river basin (IT)
20) Sesia river basin (IT)
21) Sierre-Plaine Morte (CH)
22) Spöl River (CH)
23) Sandey River (CH)



Alp-Water-Scarce Outputs and results

The handbook "Water Management in a Changing Environment" offers an overview of the main outputs of the project.

Recommendations for water managers and policy-makers (translated into EN, FR, DE, IT and SI)

A guideline on monitoring and modelling discusses the challenges of water resources management in Alpine catchments

A climate scenario guideline describes possibilities for the calculation of future scenarios as a basis for projections of future water resources

Development of 4 Early Warning Systems (Arly catchment (France) – Carinthia (Austria) – Piave basin (Italy) – Slovenia)

"Stakeholder Forum" for stakeholder deep involvement

www.alpine-space.eu/projects/projects/detail/Alp-Water-%20Scarce/show/

ARPAV activities and outputs in AWS

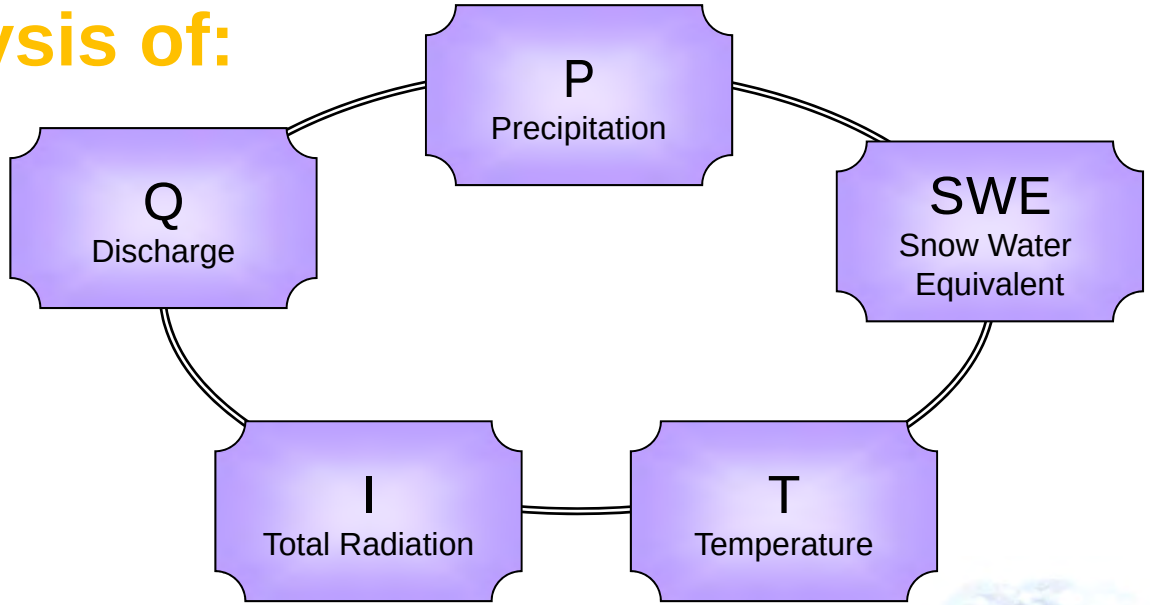
Piave River case study – Precipitation and discharge: 1923-62 vs 1984-2010

Water Scarcity Index (WSI) (Piave River)

WSI real application (2012 drought in Veneto Region)

EWS – Early Warning System

- **Statistical analysis of:**
  1. precipitation
  2. discharge
  3. temperature
  4. snow
  5. total radiation

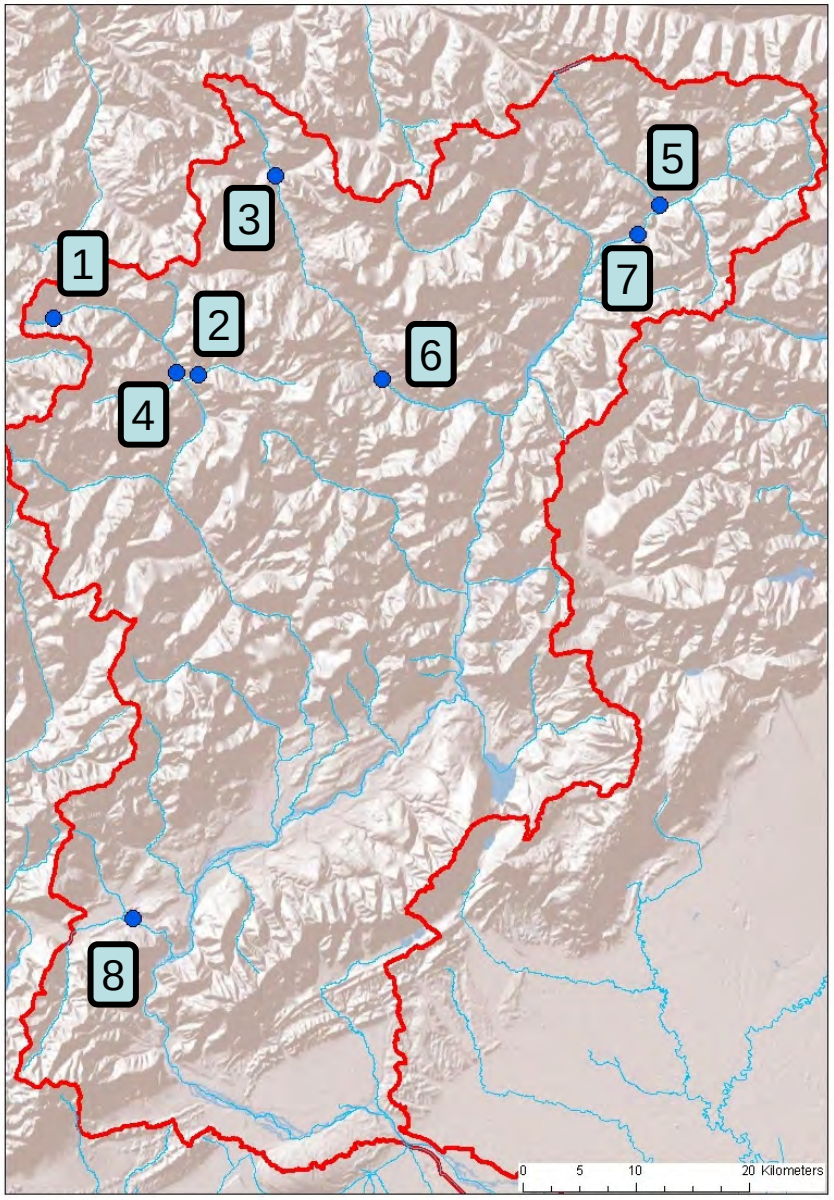


- **Method:**

  combined analysis of the main hydrological variables during the most important period for reservoirs refilling

- **Purpose:** ALERT in spring against Water Scarcity

EWS approach



Analysis of the natural discharges in 8 mountainous catchments

Alpine rivers:

1. Cordevole at La Vizza - 7.15 km^2
2. Fiorentina at Sottorovei - 56 km^2
3. Boite at Podestagno - 82 km^2
4. Cordevole at Saviner - 109 km^2
5. Padola at Santo Stefano - 134 km^2
6. Boite at Cancia - 310 km^2
7. Piave at Ponte della Lasta - 357 km^2

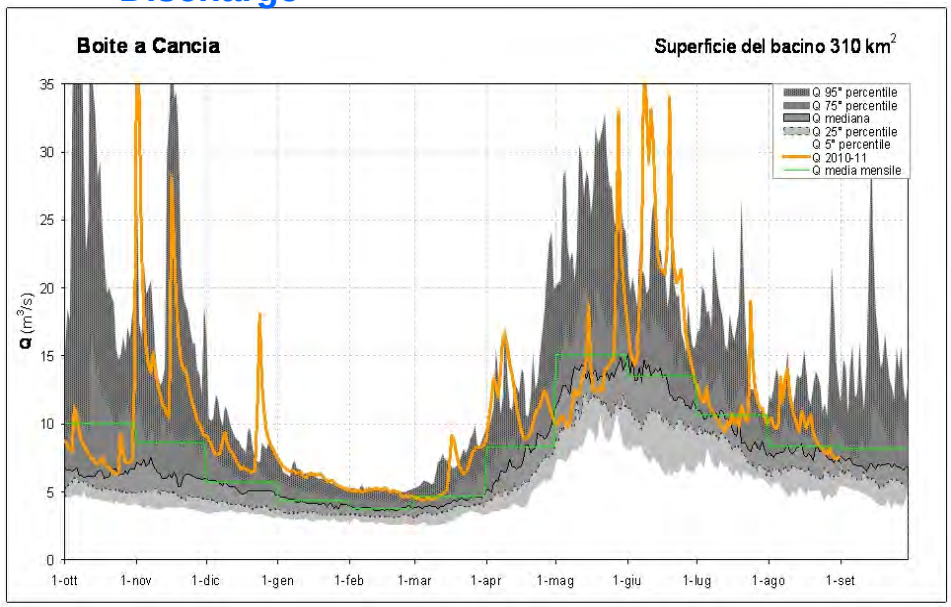
Pre-alpine rivers:

8. Sonna at Feltre 120 km^2

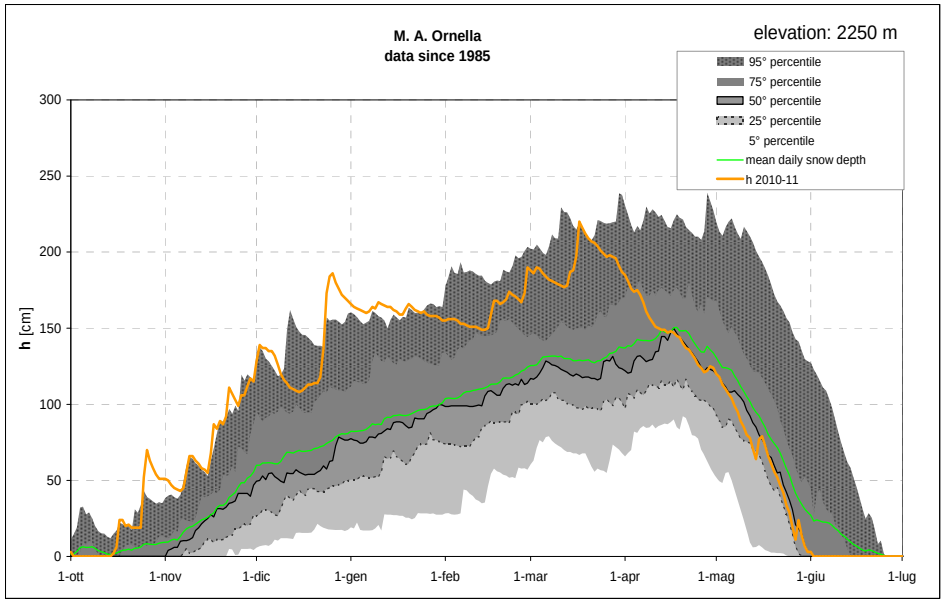
A_{tot} = 1175 km^2 ; 30% of A_{Piave}

Application of the WSI for the hydrological year 2010-2011

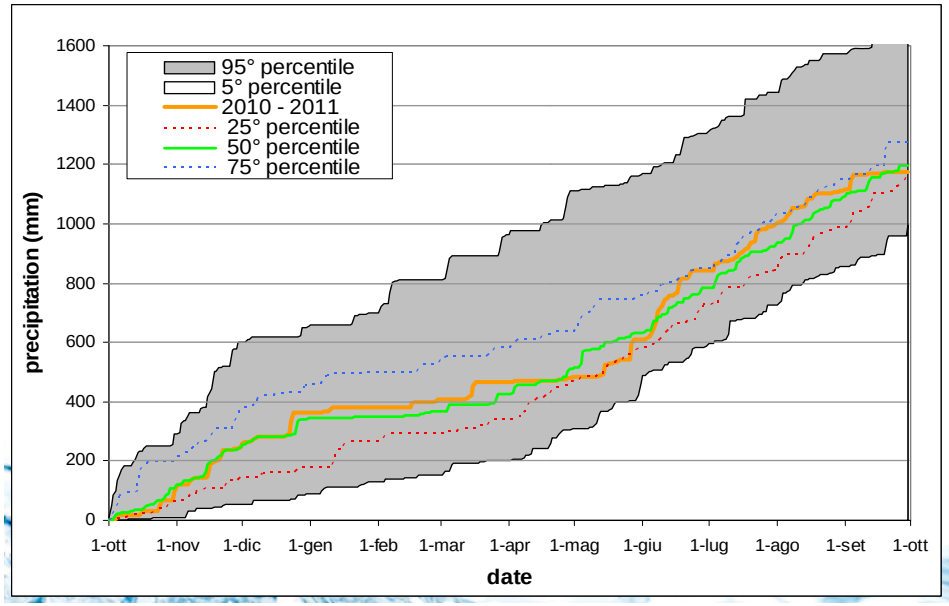
Discharge



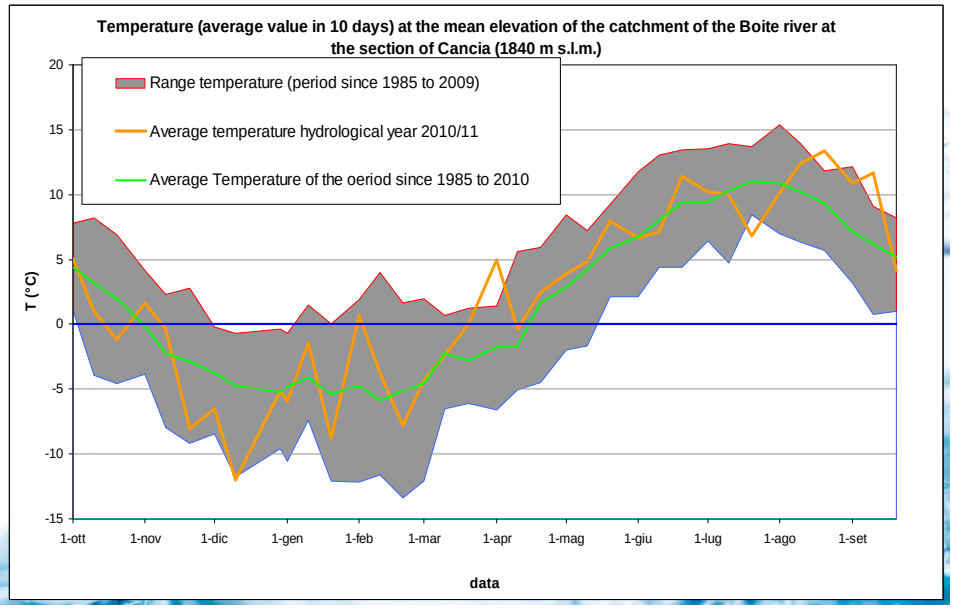
Snow



Precipitation



Temperature



WSI values – from 1990-1991

situation at: 31 January 2013													
Hydrological year (1 Oct - 30 Sep)	percentiles									WSI	Predicted water scarcity (Yes / No)	*Real situation of water scarcity (Yes / No)*	Indicator reliability
	rainfall		discharge			temperature		snow					
	cumulated rainfall from 1 Oct	cumulated rainfall from 1 Dec	mean discharge from 1 Oct	mean discharge till now	cumulated water volume drained from 1 Jan	mean temperature from 1 Oct	mean temperature from 1 Mar	snow pack - mean value of 10 days before now	cumulated snowfall till now				
weight:	***0.05***	***0.15***	***0.20***	***0.10***	***0.10***	***0.05***	***0.10***	***0.15***	***0.10***	***0.50***	***WSI threshold***		
1990 - 1991	0.82	0.67	0.41	0.69	0.59	**0.00**		1.00	0.87	0.74	N	?	-
1991 - 1992	0.52	0.52	0.61	**0.39**	0.49	**0.35**		0.69	0.54	0.60	N	?	-
1992 - 1993	0.50	**0.12**	0.56	0.43	0.51	0.58		**0.30**	0.74	**0.49**	**Y**	?	-
1993 - 1994	0.75	0.50	0.94	0.69	0.71	**0.37**		**0.19**	**0.37**	0.64	N	***Y***	failed alarm
1994 - 1995	**0.05**	**0.33**	0.59	0.61	0.58	0.55		0.61	**0.41**	0.54	N	***Y***	failed alarm
1995 - 1996	**0.00**	**0.20**	**0.38**	**0.15**	**0.18**	**0.23**		**0.11**	**0.00**	**0.29**	**Y**	*N*	false alarm
1996 - 1997	0.72	**0.03**	0.78	0.75	0.74	0.83		0.57	**0.20**	0.56	N	*N*	**OK**
1997 - 1998	**0.25**	0.57	**0.28**	0.65	0.57	0.80		0.65	0.49	0.53	N	***Y***	failed alarm
1998 - 1999	0.62	0.75	0.54	0.48	**0.38**	**0.17**		**0.34**	0.66	0.60	N	*N*	**OK**
1999 - 2000	**0.10**	**0.30**	0.64	0.66	0.63	0.52		**0.00**	**0.04**	**0.44**	**Y**	*N*	false alarm
2000 - 2001	1.00	0.87	0.93	0.93	0.97	0.85		0.92	0.91	0.89	N	*N*	**OK**
2001 - 2002	**0.38**	0.93	**0.16**	**0.18**	**0.13**	0.92		**0.15**	**0.08**	**0.36**	**Y**	*N*	false alarm
2002 - 2003	0.88	**0.02**	0.81	0.90	0.87	0.67		**0.07**	**0.29**	0.54	N	***Y***	failed alarm
2003 - 2004	0.80	0.52	**0.33**	**0.39**	0.41	**0.13**		0.96	0.95	0.65	N	*N*	**OK**
2004 - 2005	**0.22**	**0.15**	**0.36**	**0.38**	**0.35**	**0.38**		0.53	**0.25**	**0.41**	**Y**	***Y***	**OK**
2005 - 2006	**0.37**	**0.28**	0.47	**0.16**	**0.14**	**0.07**		0.42	0.62	**0.46**	**Y**	***Y***	**OK**
2006 - 2007	**0.15**	0.83	**0.05**	**0.12**	**0.09**	1.00		**0.03**	**0.16**	**0.28**	**Y**	*N*	false alarm
2007 - 2008	**0.35**	0.75	**0.15**	**0.29**	**0.22**	0.67		0.73	0.70	0.51	N	*N*	**OK**
2008 - 2009	0.95	1.00	0.65	0.76	0.72	0.60		0.88	1.00	0.83	N	*N*	**OK**
2009 - 2010	0.53	0.72	**0.32**	0.46	0.66	**0.15**		0.84	0.83	0.66	N	*N*	**OK**
2010 - 2011	0.55	0.45	0.72	0.82	0.88	0.67		0.50	0.79	0.68	N	*N*	**OK**
2011 - 2012	**0.08**	**0.15**	**0.38**	**0.21**	**0.25**	0.93		**0.23**	0.45	**0.33**	**Y**	***Y***	**OK**
2012 - 2013	0.77	0.39	0.96	0.89	0.86	0.72		0.92	0.95	0.81	N	*N*	**OK**

WSI real application – 2012 drought

Year	15/01	31/01	15/02	28/02	15/03	31/03	15/04	30/04	15/05	31/05	15/06	WSI mean
2012	0.31	0.30	0.33	0.31	0.25	0.22	0.24	0.28	0.20	0.20	0.28	**0.26**

WARNING to the River Basin Authority Level of "medium" drought

4 Ordinances of the Veneto Region President: n. 67 (3 April) – 84 (2 May) – 113 (31 May) – 130 (5 July)

Provisions against water scarcity:

- **MIF reduction (up to 50%)**
- **reduction of water withdrawal for agriculture (up to 40%)**
- **retain additional water in the reservoirs**
- **maintain high water level in the reservoirs**
- **avoid water waste (responsible behaviours)**

Alp-Water-Scarce open questions

1. common understanding of the terms “water scarcity” and “drought”;
2. legislation dedicated to drought and water scarcity exists only to a limited extent clear set of regulations and cooperation agreements
3. establishment of Early Warning Systems (AWS: Arly catchment (France) – Carinthia (Austria) – Piave basin (Italy) – Slovenia);
4. implementation of simulation models (assessment of future water supply and demand);

Alp-Water-Scarce open questions

5. interregional and trans-boundary co-operation to secure water resources (co-op. activities between countries, common scientific studies, data exchange…)

Create an "Alpine Water Management Committee" consisting of water managers, researchers and representatives of relevant sectors

tools development against water scarcity
avoid and overcome periods of water scarcity
long-term integrated water resources management strategy in the Alps

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Thank you for your attention

4 August 2011

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Thank you for your attention

12 September 2011