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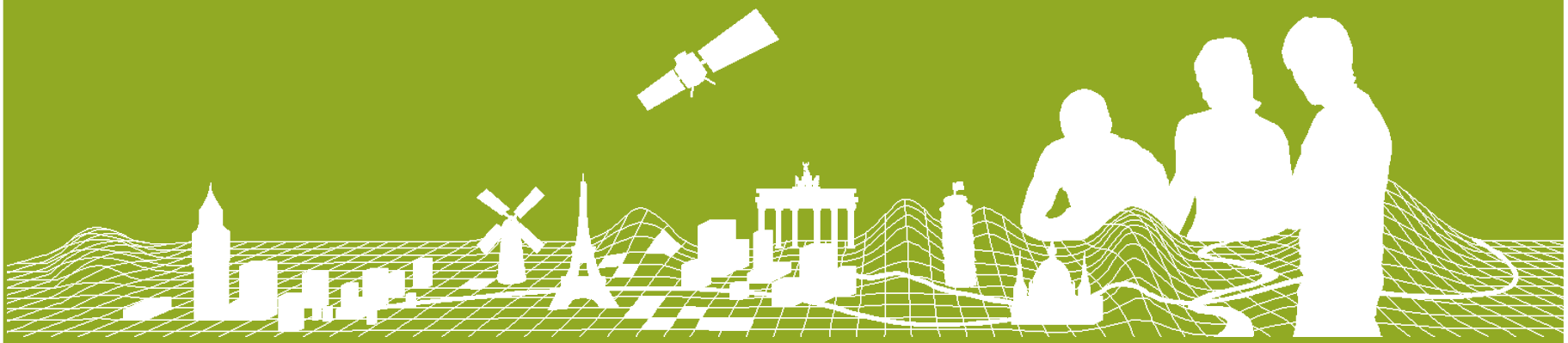
FRAMEWORK FOR EUROPE

ERM v8 Quality Assessment

Sonja Werhahn/ BKG

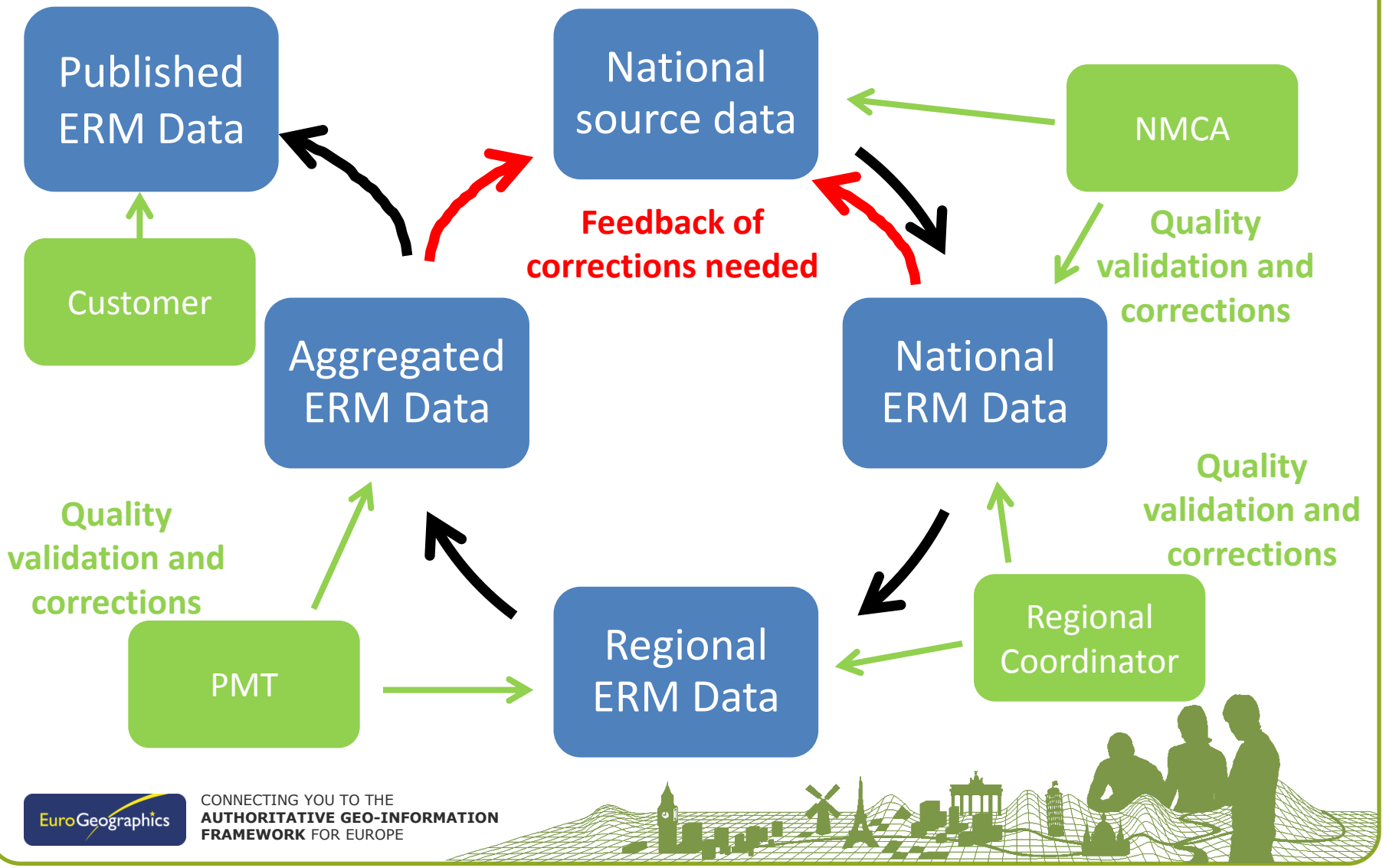
Technical Meeting of the EG Data Producers, 31.3.2015



Agenda

- Quality evaluation process
- Results from quality assessment ERMv8.0
- Data quality tools

Quality evaluation process



What is done by RC?

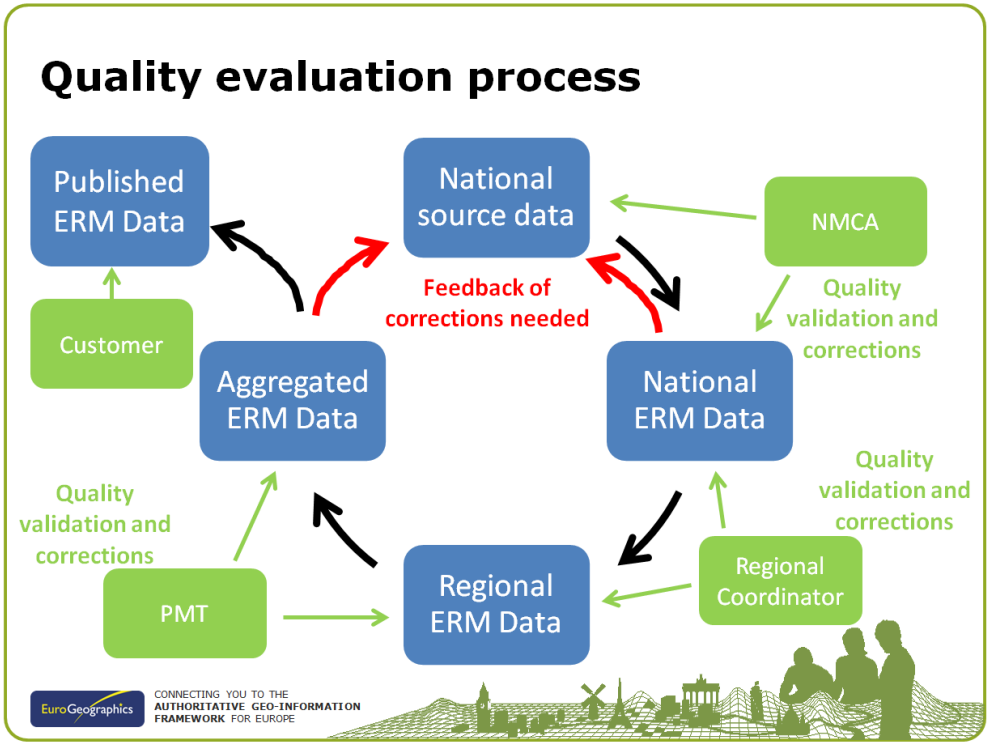
- Validation of national deliveries
- Report to producers including remarks on data quality
- Aggregation of data to regional data set
- Special focus on international features (mainly HydroID for rivers and lakes)
- Some last minute changes (correction of small errors)
- Calculate SN and ARA / LEN if necessary

What is done by PMT?

- Validation of regional deliveries
- Aggregation of data to final data set
- Special focus on international features between groups (mainly HydroID for rivers and lakes)
- Some last minute changes (correction of small systematic errors)
- Creation of SeaA, HynodeC, LandmaskA and ShoreL
- Calculation of LAKERES_WBSC

Result

- Changes and corrections to national ERM data are made at various stages
- Feed back as much as possible into the national data base and national production process



Agenda

- Quality evaluation process
- Results from quality assessment ERMv8.0
- Data quality tools

Evaluation Concepts

- **Completeness**

  Are all features present that should be there according to the specifications?

  →Mandatory and optional FC and attributes, data capture rules, ...

- **Correctness** can be evaluated in terms of
  - logical consistency,
  - spatial accuracy,
  - thematic accuracy
  - and temporal accuracy.

  → Geometric errors, topological errors, attribute value errors, ...

Completeness: Mandatory Feature Classes

		BE	BG	CY	GB	GR	LU	MD	NL	RO	CH	ES	FR	GE	IE	IT	MT	ND	PT	DK	EE	FI	FO	IS	LT	LV	NO	SE	AT	CZ	DE	HU	ME	PL	RS	SI	SK
BND																																						
POLBNDA	M		EBM			EBM																										v7	N_P				
POLBNDL	M		EBM			EBM																										v7	N_P				
EBM_NAM	M		v6			v6.0																										v7	N_P				
EBM_ISN	M		v6																													v7	N_P				
ERM_CHR	M		v6																														N_P				
HYDRO																																					
COASTA	M			N_A			N_A	N_A		N_A	N_A	N_P		N_A	v7	N_A	N_A		v7		N_A	N_A	N_A		N_A	N_A	N_A	N_A	N_A	N_A		N_A	N_A	N_A	N_A	N_A	N_A	N_A
COASTL	M		v6			v6.0	N_A	N_A			N_A	v7			v7		v7		v7											N_A	N_A		N_A	v7		N_A		N_A
DAML	M					v6.0						v7			N_P		N_A		v7	N_A	N_A													v7			N_A	
DAMC	M			N_P		v6.0						v7			v7		N_A		v7				N_P				N_P						N_P				
LAKERESA	M		v6			v6.0						v7			v7		N_A		v7															v7				
ISLANDA	M	N_A	v6			v6.0	N_A	N_A			N_A	v7		N_A	v7		v7		v7											N_A			N_A	v7			N_A	N_A
SEAA	M		v6			v6.0	N_A	N_A			N_A	v7			v7		v7		v7											N_A	N_A		N_A	v7		N_A		N_A
SWAMPA	M			N_P	N_P		N_A					v7			N_P		N_A	N_A	v7								N_P						N_P				
WATRCRSA	M		v6			v6.0						v7		N_A	N_A		N_A	N_A	v7														v7				
WATRCRSL	M		v6			v6.0						v7			v7		v7		v7														v7				
WATRCRS_MDC	M		v6	N_P		v6.0	x	N_P			v7	v7	v7		v7		N_A		v7				N_A	N_A									v7				
LAKERES_WBSC	M		v6	N_P		v6.0	x	N_P									N_A																v7				
POP																																					
BUILTUPA	M		v6			v6.0											v7		v6														v7				
BUILTUPP	M		v6			v6.0											v7		v6														v7				
TRANS																																					
AIRFLDA	M					v6.0					v7	v7	v7		v7		v7		v7														N_P				
AIRFLDC	M					v6.0					v7	v7	v7		v7		v7		v7														N_P				
AIRFLDP	M			N_A							v7	v7	v7		v7		N_P	N_A	v7				N_P										v7				
FERRYL	M		v6			v6.0		N_A			v7	v7	v7		v7	v7	v7	v7	v7														N_P		N_A		
FERRYC	M		v6			v6.0		N_A			v7	v7	v7		v7	v7	v7	v7	v7														N_P		N_A		
HARBORA	M						N_A	N_A		N_P	N_A	N_P	v7		v7		v7		v7	N_P			N_P					N_P	N_A	N_A		N_A	N_P				
HARBORC	M			N_A			N_A	N_A		N_P	N_A	N_P	v7		v7		v7		v7	N_P			N_P					N_P	N_A	N_A		N_A	N_P				
HARBORP	M		v6	N_A						N_P	N_A	N_P	v7		v7		N_A		v7									N_P	N_A			N_A	N_P				N_A
HELIP	M			N_A		v6.0		N_A			v7	v7	v7		N_A		v7	N_A	v7														N_P			N_P	
INTERCC	M					v6.0					v7	v7			v7		v7		v7		N_A		N_A	N_A									N_P				
LEVELCC	M		v6								v7	v7			v7		v7		v7														v7				
RAILRDL	M		v6	N_A		v6.0					v7	v7			v7		N_A		v7				N_A	N_A									v7				
RAILRDC	M			N_A		v6.0					v7	v7			v7		N_A		v7				N_A	N_A									N_P				
RESTC	M			N_A		v6.0		N_P			v7	v7			N_P		N_P	N_A	v7				N_P	N_P									N_P				
ROADL	M		v6			v6.0					v7	v7			v7		v7		v7														v7		no local r		
RUNWAYL	M					v6.0					v7	v7	v7		v7		v7		v7														N_P				
POI																																					
GOVSERVP	M		v6			v6.0				N_P					N_P		v7															N_P	N_P		N_P		
FACILP	M		v6						N_P	N_P					N_P		v7						N_P									N_P	N_P		N_P		
MISC																																					
PARKA	M							N_A									N_P		N_P								N_P					N_P	N_P		N_P		
NAME																																					
NAMET	M			N_P						N_P			v6	N_P			N_P																N_P		N_P		
VEG																																					

Completeness: Optional Feature classes

ERM Version 8.0		A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D
		BE	BG	CY	GB	GR	LU	MD	NL	RO	CH	ES	FR	GE	IE	IT	MT	ND	PT	DK	EE	FI	FO	IS	LT	LV	NO	SE	AT	CZ	DE	HU	ME	PL	RS	SI	SK
BND																																					
HYDRO																																					
AQUEDCTL	O	N_A			N_P		N_A	N_A		N_P	N_P	N_P		N_A	N_A	N_P	N_A	N_A	N_A	N_A	N_A	N_A	N_A		N_A	N_A	N_A	N_A		N_P	N_P	N_P	v7	N_P	N_P	N_P	N_P
LANDICEA	O	N_A		N_A	N_A	v6.0	N_A	N_A	N_A	N_P		v7			N_A		N_A	N_A	N_A	N_A	N_A	N_A	N_A	N_A		N_A	N_A			N_A		N_A	N_A	N_A	N_A	N_A	N_A
SPRINGP	O	N_A	v6		N_P		N_A	N_P	N_A			v7			N_A	N_P	N_A	N_P	v7			N_A	N_P				N_P	N_P	N_P	N_P		N_P	N_P				
SPRINGC	O	N_A			N_P		N_A	N_P	N_A			N_P			N_A	N_P	N_A	N_P	N_P			N_A	N_P	N_P			N_P	N_P		N_P		N_P	v7	N_P			
RAPIDSL	O	N_A		N_P	N_A		N_A	N_A	N_A	N_P		N_P	N_P	N_A	N_A	N_P	N_A	N_A	N_A	N_A	N_A	N_A	N_P		N_A		N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P
RAPIDSC	O	N_A			N_A		N_A	N_A	N_A	N_P		N_P			v7	N_P	N_A	N_A	N_A	N_A		N_A	N_P	N_P		N_A		N_P	N_P		N_P		N_P	N_P				
SEASTRTL	O				N_P		N_A	N_A			N_A	N_P	N_P		N_P		v7	N_P	N_P	N_P		N_P	N_P				N_P		N_P	N_A	N_A		N_A	N_P		N_A		N_A
WELLP	O	N_A	v6	N_P	N_P	v6.0	N_A	N_P	N_A	N_P	N_P	v7	N_P		N_P	N_P	N_A	N_P	N_P	N_P		N_A	N_P				N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P
POP																																					
URBANP	O		v6	N_P				N_P	N_P			N_P	N_P		N_P	N_P	N_P	N_P	N_P										N_P			N_P	N_P			N_P	
TRANS																																					
EXITC	O	N_A	v6	N_P	N_A	v6.0	N_A		N_A		N_A	v7	v7		N_A	N_A	N_A	N_A	N_A	N_A			N_A	N_A				N_A	N_A	N_A	N_A	N_A		v7				
HARBORL	O	N_A	v6		N_P	v6.0	N_A	N_A	N_A	N_P	N_A	v7	N_P		N_P	N_P	v7	N_P	N_P									N_P	N_A	N_A		N_A	N_P	N_P	N_A			
MISAEROP	O	N_A			N_P	v6.0	N_P		N_A		N_P	N_P	N_P		N_A	N_P	N_P	N_P	N_P			N_P	N_P	N_P				N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P	N_P		
POI																																					
MISC																																					
BUILDP	O																v6		v6								N_P					N_P			N_P			
CTOWERP	O									N_P		N_P			N_P	N_P	N_P	N_P	v6								N_P		N_P			N_P			N_P			
EXTRACTP	O	N_P							N_A	N_P						N_P	v6	N_P	v6								N_P					N_P			N_P			
INDPROL	O	N_A		N_A	N_P		N_A	N_P	N_A	N_P		N_P			N_P	N_P	N_P	N_P	N_P								N_P		N_P			N_P	N_P	N_P	N_P	N_P	
INDPROP	O				N_P				N_A	N_P		N_P			N_P	N_P	v6	N_P	N_P								N_P		N_P			N_P			N_P	N_P		
LANDMARKP	O						N_P	N_P	N_P						N_P	N_P	v6		v6								N_P					N_P	N_P		N_P			
PHYSL	O	N_P		N_P	N_A		N_P			N_P		N_P	N_P	N_P	N_P	N_P	v6	N_P	v6								N_P		N_P			N_P			N_P	N_P	N_P
PHYSP	O	N_P		N_P			N_P		N_A	N_P					N_P	N_P	v6	N_P	N_P								N_P					N_P	N_P		N_P			
POWERL	O				N_P					N_P					N_P	N_P	N_P		v6								N_P					N_P		N_P	N_P			
POWERP	O									N_P							v6		v6													N_P			N_P			
TOWERP	O				N_P					N_P		N_P		N_P	N_P	N_P	N_P	N_P	v6								N_P		N_P			N_P			N_P			
NAME																																					
VEG																																					
SOILA	O					v3.0	N_A	N_P		N_P							v6	N_P												N_P		N_P			N_P		N_P
VEGA	O					v3.0						N_P					v6																		N_P		

Completeness: Requirements from old Eurostat contract

T	Issues	BE	BG	CY	GB	GR	LU	MD	NL	RO	CH	ES	FR	GE	IE	IT	MT	ND	PT	DK	EE	FI	FO	IS	LT	LV	NO	SE	AT	CZ	DE	HU	ME	PL	RS	SI	SK
BND																																						
	Proper Census date (most curent update, possibly EBM reference date	no	no	yes	yes	no	no	no	yes	yes	Yes	Yes	Yes	N_A	Yes	Yes	Yes	Yes	Yes	yes	yes	yes	yes	yes	yes	partial	yes	yes	yes	yes	yes	no	no	yes	yes	yes	yes
HYDRO																																					
	Data capture of locks on rivers	yes	no data	yes	yes	no data	yes	yes	yes	yes	Yes	No	Yes	Yes	N_A	Yes	N_A	Yes	Yes	yes	yes	yes	N_A	N_A	N_A	yes	N_A	yes	yes	yes	yes	no	yes	yes	N_A	yes
	Names for Dams (Mandatory)	yes	no data	partial	yes	no data	partial	no	no	yes	Partly	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Yes	N_A	no	yes	yes	yes	yes	yes	yes	yes	partial	partial	partial	no	no	yes	yes	no	partial
	Names for Locks (Optional) but	yes	no data	N_A	N_A	no data	partial	N_A	no	yes	No	No	Yes	Yes	N_A	Yes	N_A	Yes	Yes	yes	no	yes	N_A	N_A	N_A	yes	N_A	yes	yes	partial	yes	no	no	yes	yes	N_A	yes
	Hydrold on all Watercourses	yes	no data	yes	yes	no data	yes	yes	yes	no	Yes	32%	Yes	Yes	Yes	Yes	No	Yes	Yes	yes	yes	no	no	no	yes	no	yes	yes	yes	yes	no	yes	no	yes	no	yes	yes
	Hydrold on Watercourses having a drainage basin > 500 km²	yes	no data v8	yes	yes	no data v8	yes	no	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Yes	yes	yes	no	N_A	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Hydrold on Dams	yes	no data	yes	yes	no data	yes	yes	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Yes	N_A	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Hydrold on Locks	yes	no data	yes	N_A	no data	yes	N_A	yes	yes	Yes	Yes	Yes	Yes	N_A	Yes	N_A	Yes	Yes	yes	yes	yes	N_A	N_A	N_A	yes	N_A	yes	yes	yes	yes	yes	N_A	yes	yes	N_A	yes
	Hydrold on lakes and selection criteria adopted	yes	no data v8	yes	yes	no data v8	yes	yes	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Navigability Information Code (attribute NVS) for navigable watercourses	yes	no data v8	yes	yes	no data v8	yes	yes	yes	yes	Yes	Yes	Yes	N_A	Yes	Yes	No	No navigable watercourses	Yes	N_A	yes	yes	yes	N_A	N_A	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Continuity on NVS (close network)	yes	no data v8	yes	yes	no data v8	yes	yes	yes	yes	Yes	Only 1 object	Yes	N_A	Yes	Yes	N_A	No navigable watercourses	Yes	N_A	yes	yes	yes	N_A	N_A	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Place in hierarchy for watercourse (MDC)	yes	no data	N_P	yes	no data	yes	no	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Yes	yes	yes	yes	yes	N_A	N_A	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Water Flow Direction (LDV)	yes	no data	N_P	yes	no data	yes	no	yes	partial	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	no	yes	yes	no	no	no	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Full connectivity of watercourses	partial	no data	no	yes	no data	yes	yes	yes	N_A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	partial	yes
	Width of Watercourse	yes	no data	partial	yes	no data	yes	no	yes	no	Yes	No	Yes	Only 1 range	Yes	Yes	No	Yes	Only 2 ranges	yes	yes	yes	yes	yes	partial	yes	yes	yes	no	yes	yes	yes	no	no	yes	no	yes	yes
TRANS																																					
	road (COR)	yes	no	yes	yes	no	yes	yes	yes	N_A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Railway: Speed classes (attribute RSD)	yes	no data	N_A	yes	no data	partial	no	yes	yes	Yes	Yes	Yes	Yes	No	Yes	N_A	Yes	Yes	yes	yes	yes	N_A	N_A	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Railway: Transport type added (TUC)	partial	no data	N_A	yes	no data	partial	no	yes	yes	Yes	Yes	No	Yes	Yes	Yes	N_A	Yes	Yes	yes	yes	yes	N_A	N_A	yes	yes	partial	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
	Railway stations: the transport types attribute added (TUC)	yes	no data v8	N_A	yes	no data v8	yes	no	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Yes	yes	yes	yes	N_A	N_A	yes	yes	partial	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
	Railway station: Node types added (TFC)	yes	no data	N_A	yes	no data	yes	no	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Yes	yes	yes	yes	N_A	N_A	yes	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
	Road, Railway: TEN-T added	yes	no data	yes	yes	no data	yes	no	yes	yes	Only on	Yes	Yes	N_A	Yes	Yes	N_A	Yes	Yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	N_A	yes	N_A	yes	yes
	The completion of the road network link	partial	no data	yes	yes	no data	yes	no	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	N_A	Yes	Done in v5.0	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	yes
	Ports (HARBORP and HARBORC) added	yes	no data	no	yes	no data	yes	yes	yes	N_A	N_A	No	Yes	Yes	No	Yes	No	Yes	Harbor C	partial	yes	yes	partial	yes	yes	yes	yes	partial	N_A	yes	yes	N_A	no	yes	yes	yes	yes	yes
POP																																					
	Population figures > 2003	no	no data	yes	yes	no data	no	no	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	?	2008	Yes	yes	yes	yes	yes	yes	yes	partial	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Country, regional capitals added (USE)	yes	no data	yes	yes	no data	yes	yes	yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Partly	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

ERMv8: Mandatory Feature Classes HYDRO

Feature Class		yes	no	N_A
COASTA	M	10	3	23
COASTL	M	26	2	8
DAML	M	29	3	4
DAMC	M	29	6	1
LAKERESA	M	33	2	1
ISLANDA	M	25	2	9
SEAA	M	26	2	8
SWAMPA	M	27	6	3
WATRCRSA	M	30	2	4
WATRCRSL	M	34	2	0
WATRCRS_MDC	M	27	6	3
LAKERES_WBSC	M	29	6	1

ERMv8: old Eurostat contract HYDRO

Eurostat requirement	yes	partial	no	N_A
Data capture of locks on rivers	25	0	4	7
Names for Dams (Mandatory)	19	7	8	2
Names for Locks (Optional) but welcome (FYI)	16	2	8	10
HydroId on all Watercourses	25	0	11	0
HydroId on Watercourses having a drainage basin > 500 km²	30	0	4	2
HydroId on Dams	32	0	2	2
HydroId on Locks	24	0	2	10
HydroId on lakes and selection criteria adopted	33	0	2	1
Navigability Information Code (attribute NVS) for navigable watercourses	29	0	3	4
Continuity on NVS (close network)	27	1	2	6
Place in hierarchy for watercourse (MDC)	29	0	4	3
Water Flow Direction (LDV)	24	1	11	0
Full connectivity of watercourses	30	2	3	1
Width of Watercourse	22	4	10	0

Completeness:
Conclusion for Production 2015

- For each country discuss with RC if any new feature classes (concentrate on mandatory FC) or Eurostat requirements can be delivered

Correctness

- Check with ERM tools and ArcGIS Reviewer

- Individual errors reported by RC

- Topological errors
- Geometry errors
- Attribute errors

Correctness: General remarks

- No NULL values (or empty values) are allowed
  - Use UNK, N_P, N_A, …

- Use UNK, N_P and N_A correctly

Attribute value Attribute Type	Null/No Value	Unknown	Unpopulated	Not Applicable
Meaning in the real world context	*Information cannot be applied*	*Information is missing*	*Information exists but has not been collected*	*Information doesn't exist*
Text	*N/A*	*UNK*	*N_P*	*N_A*
Integer Coded	*-32768*	*0*	*997*	*998*
Integer Actual Value	*-32768*	*-29999*	*-29997*	*-29998*

Correctness: General remarks

- Use correct language code (ISO 639-2/B 3-Char)
- Populate name and language attributes correctly

  (table page 152 Annex A in Technical guide)

EuroRegionalMap

Possible combinations of the name attributes

Taken over from EGM // Introduced by BKG/Germany (Sonja Werhahn)

NAMN1	NAMN2	NAMA1	NAMA2	NLN1	NLN2
abc	xyz	abc	xyz	L1	L2
N_A	xyz	N_A	xyz	N_A	L2
abc	UNK	abc	UNK	L1	N_A
abc	N_P	abc	N_P	L1	N_A
abc	N_A	abc	N_A	L1	N_A
UNK	UNK	UNK	UNK	N_A	N_A
UNK	N_P	UNK	N_P	N_A	N_A
UNK	N_A	UNK	N_A	N_A	N_A
N_P	UNK	N_P	UNK	N_A	N_A
N_P	N_P	N_P	N_P	N_A	N_A
N_P	N_A	N_P	N_A	N_A	N_A
N_A	N_A	N_A	N_A	N_A	N_A
N/A	N/A	N/A	N/A	N/A	N/A

Correctness: General remarks ERM_CHR

- Has been corrected and amended for ERMv8
- Please check that all laguages used are included and correct

Correctness: Conclusion for Production 2015

- Please have a look at Quality report from last release (ERMv8) before delivering data to RC
- Use correct attribute values

Agenda

- Quality evaluation process
- Results from quality assessment ERMv8.0
- Data quality tools

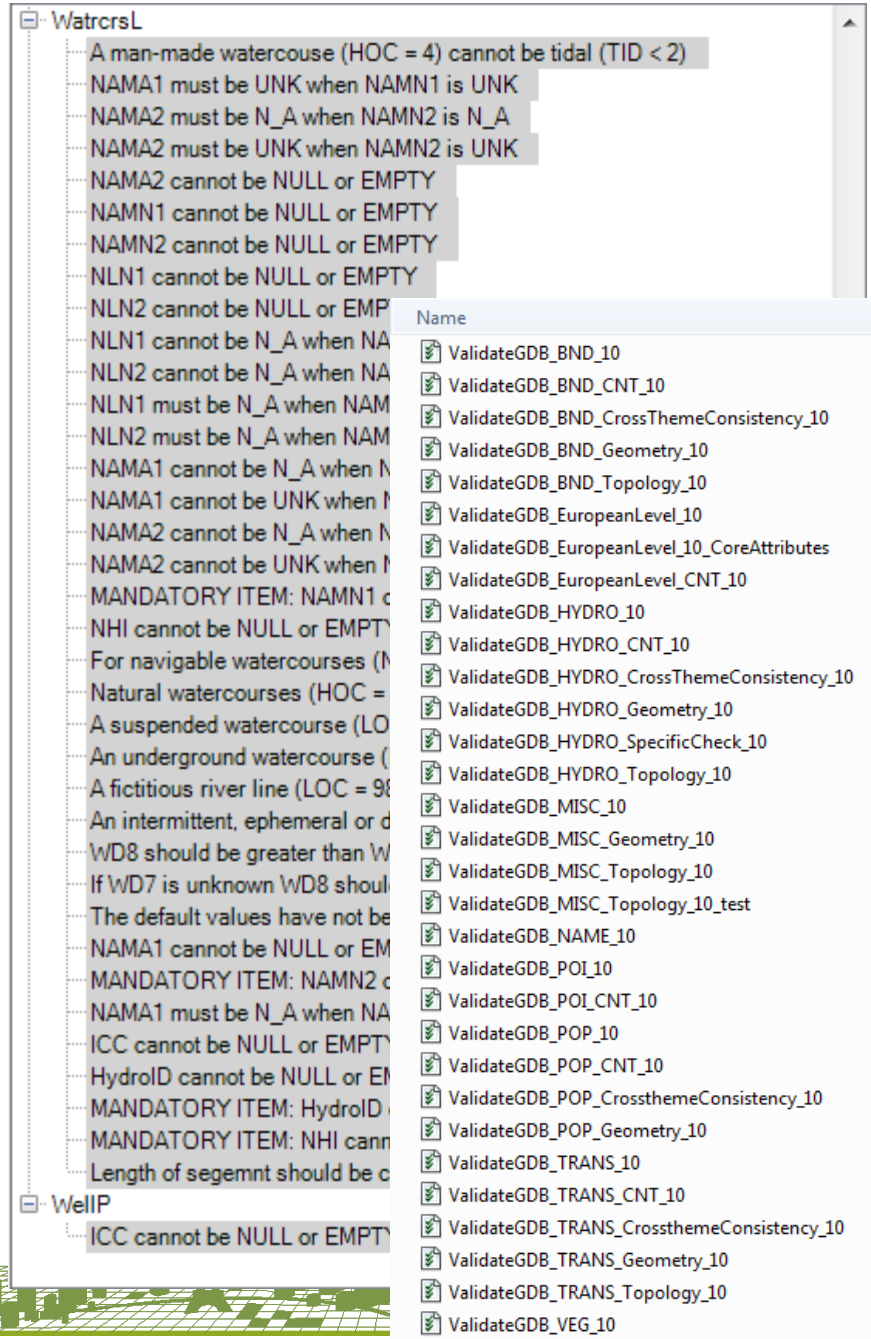
ERM Data quality tools

- ArcGIS Reviewer
- C#-Tools

ArcGIS Reviewer

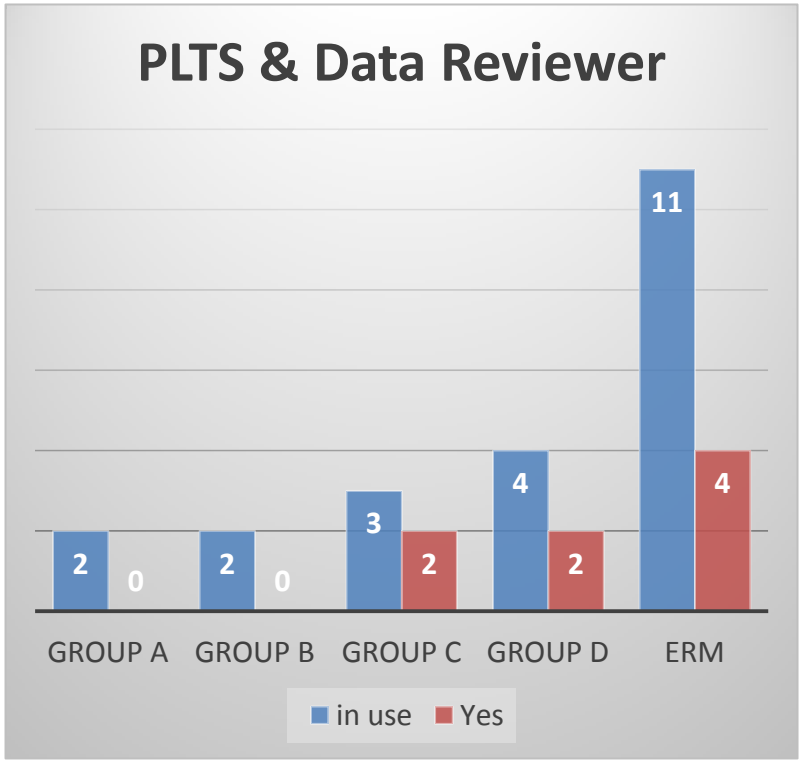
- Should be used by producers
- Used for validation of national data by RC and PMT
- Batch job files
- For all themes
- Can be modified by user

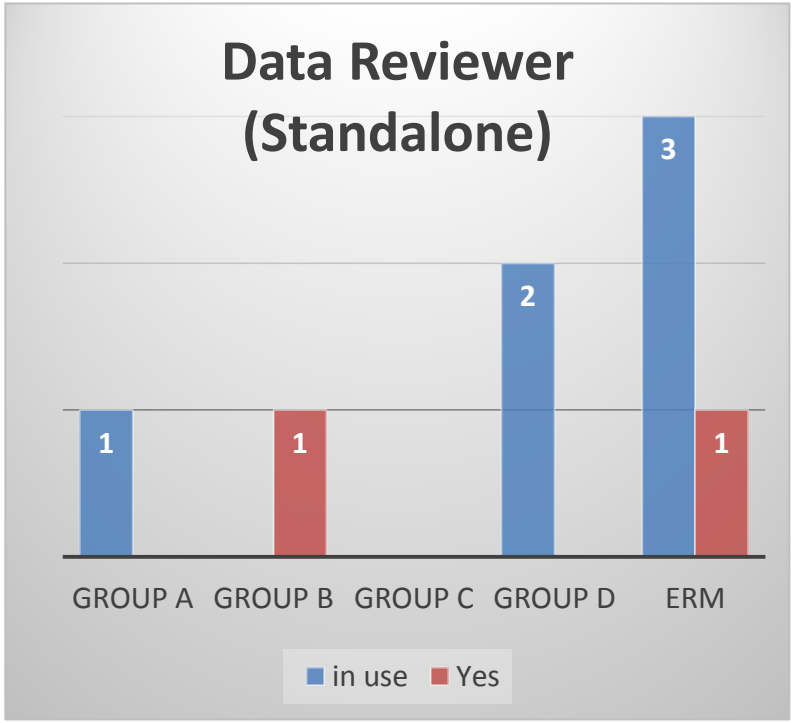
- Will be updated in 2015



ERM Production Platform: Status 2014

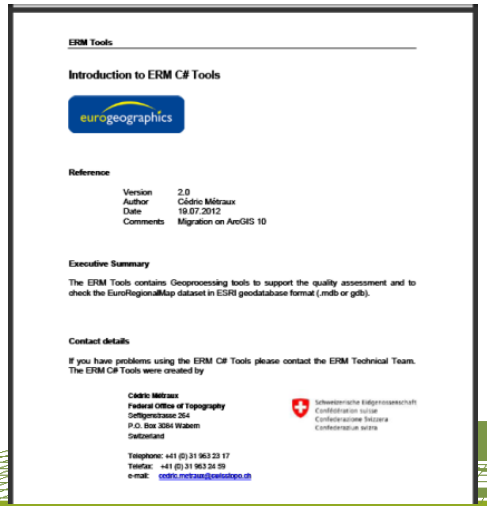
- Production Mapping (PLTS) & Data Reviewer





C# Tools

- Should be used by producers
- Used for validation of national data by RC and PMT
- Created by swisstopo
- Tools migrated to ArcGIS10.2
- Configuration files allow modification by user
- Documentation available



ERM Tools

Introduction to ERM C# Tools

eurogeographics

Reference

Version	2.0
Author	Cédric Métraux
Date	19.07.2012
Comments	Migration on ArcGIS 10

Executive Summary

The ERM Tools contains Geoprocessing tools to support the quality assessment and to check the EuroRegionalMap dataset in ESRI geodatabase format (.mdb or gdb).

Contact details

If you have problems using the ERM C# Tools please contact the ERM Technical Team. The ERM C# Tools were created by

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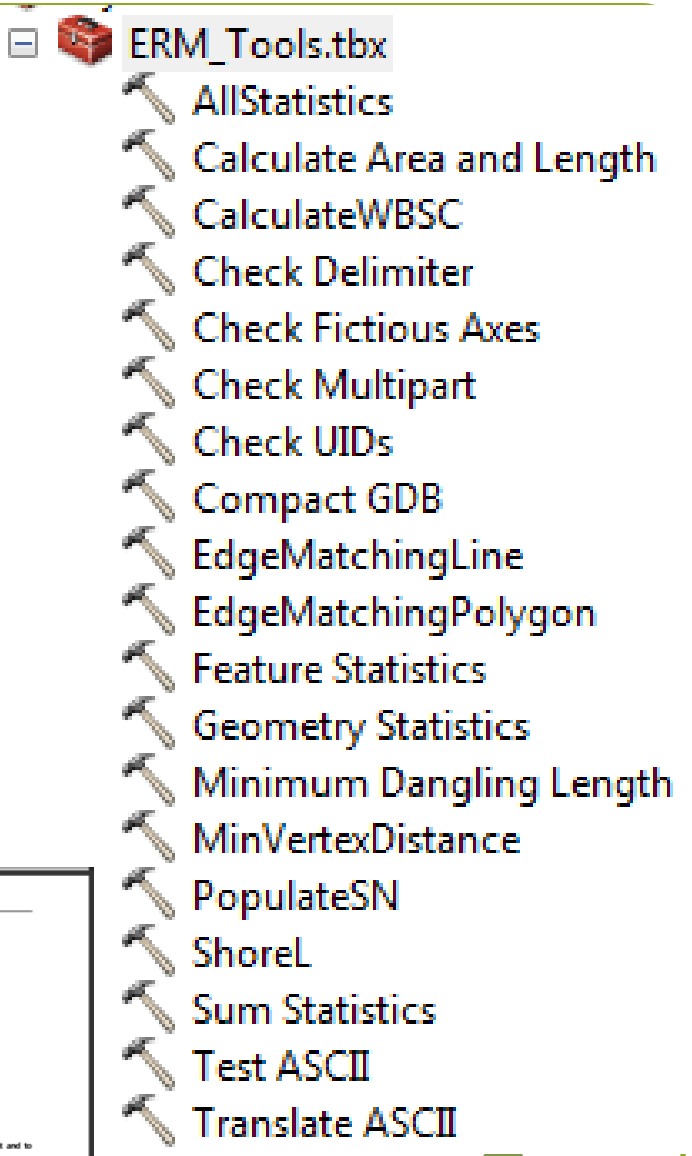
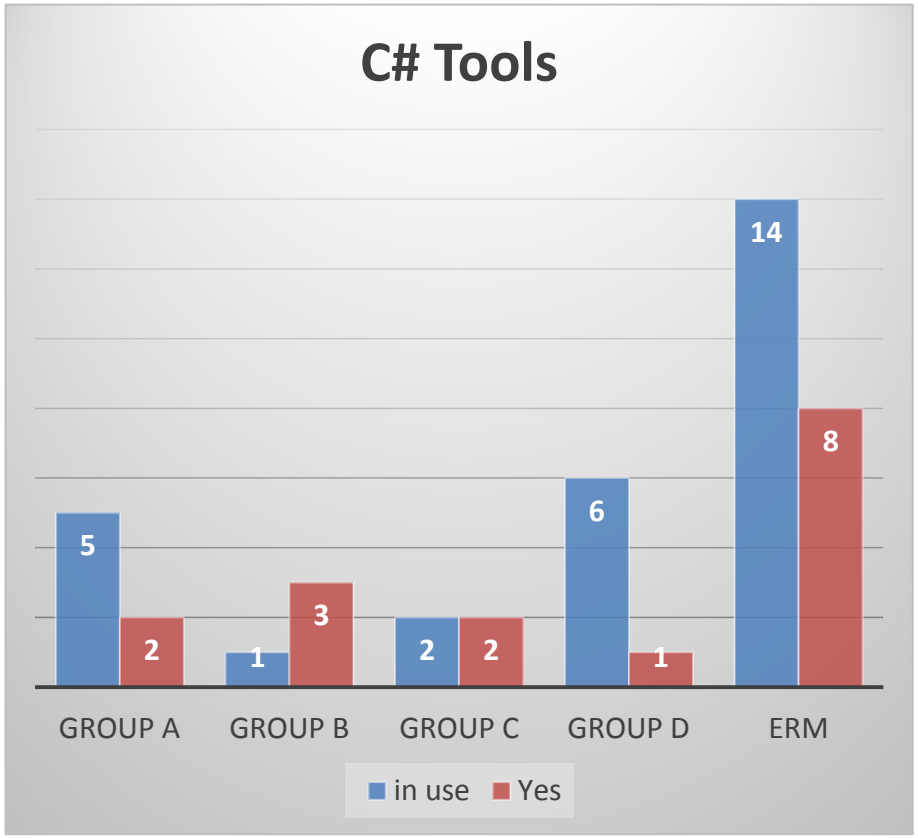


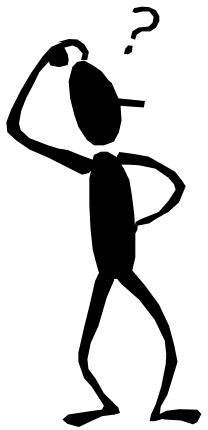
C# Tools: Status 2014

- Use of C# Tools



ERM Data quality tools: Conclusions

- If possible please use the provided tools!
- If you have problems using the tools please ask your RC!
- If you use other tools please try to create and run the same checks as in ERM tools



Any questions ?

Thank you for your attention!