Sea Level CCI project
Phase II

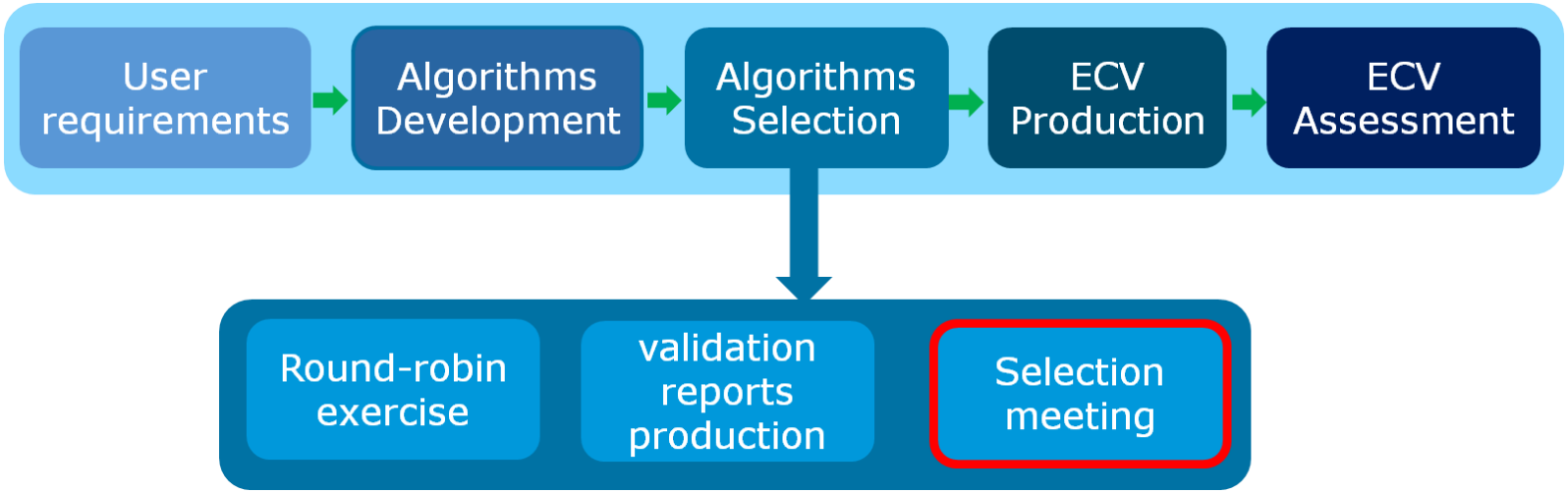
Selection Meeting

26-27th November 2015

Objectives of « selection meeting »

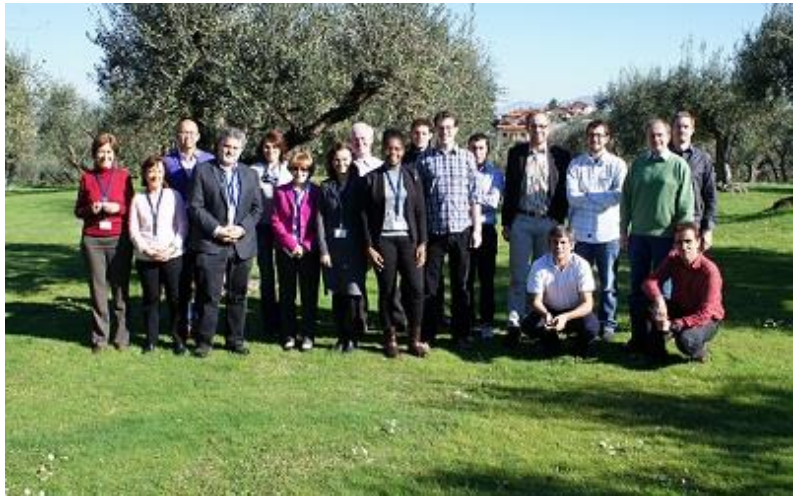
• Provide recommendations for the selection of the algorithms that will be used for the generation of the SL_cci ECV product: release 2.0

• Identify way of improvements and ideas for future investigations



SI_cci selection team

SL_cci team, ESRIN Jan. 2015



+ External altimeter experts

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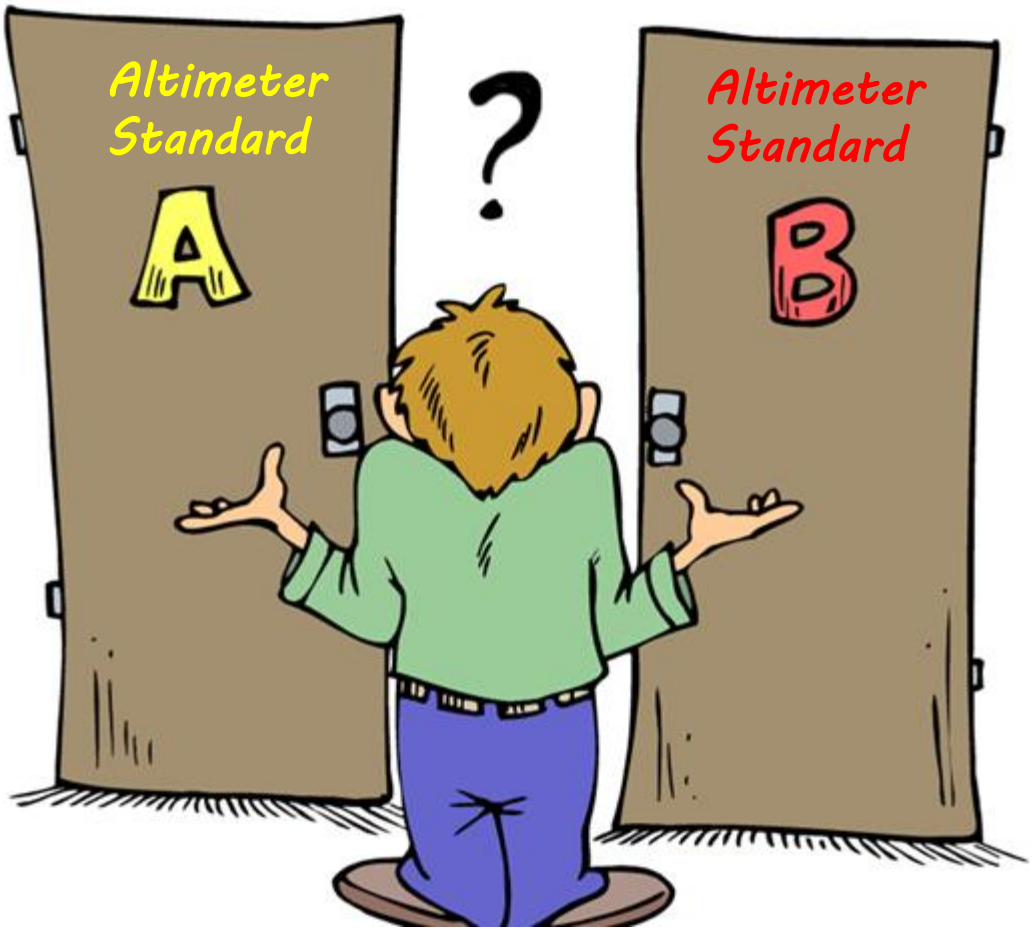
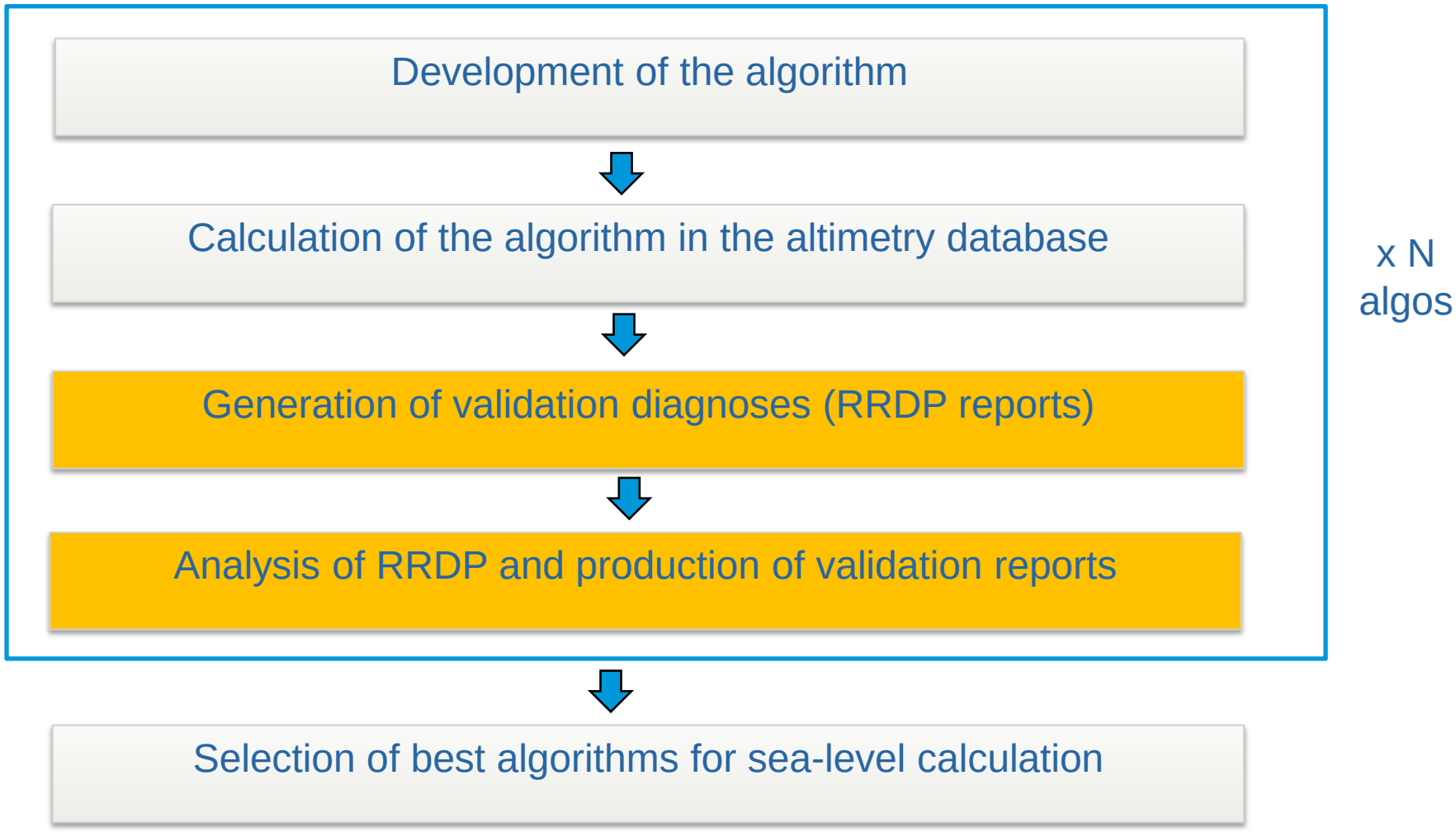
How to select the best altimeter standards ?



How to select the best altimeter standards ?

- Same approach as in phase 1
- Using of the formal procedure developped in SL_cci phase 1



How to select the best altimeter standards ?

• The basic principle of validation diagnosis is to compare the new algorithms or the new product with the reference ones. The reference algorithms or products are the state of the art at the beginning of the project.

• A main principle of validation strategy is to use a common set of validation diagnoses for all the algorithms. This strong principle allows us to compare the impact of different algorithm categories together with comparable statistics. This will be also a rigorous approach to characterize the sea-level altimetry errors better.

⇒The validation strategy including the validation diagnoses have been defined in the Product Validation Plan (PVP) : this document have been performed by all the participants of the projects.

How to select the best altimeter standards ?

- Validation diagnoses are classified by categories

Type	Objective
Global internal analyses	Ensure the internal consistency of new proposed algorithms compared to standard or reference and to measure the global system performances improvements.
Global multi-mission comparisons	Measure the sea-level consistency improvements between different altimetry missions using the new algorithms
Global altimetry and in-situ data comparison	use independent data to measure the impact of new algorithms on the sea-level calculation derived from altimetry missions.

How to select the best altimeter standards ?

Climate Applications	Temporal Scales	Definition of the indicator value		
		Significant impact	**Low impact**	**No impact detected**
Global Mean Sea Level	Long-term evolution (trend)	Trend > 0.15 mm/yr	Trend > 0.05 mm/yr	Trend < 0.05 mm/yr
	Inter annual signals (> 1 year)	Amplitude > 0.5 mm	Amplitude > 0.2 mm	Amplitude < 0.2 mm
	Periodic Signals	Amplitude > 1 mm	Amplitude > 0.2 mm	Amplitude < 0.2 mm
Regional Mean Sea Level	Long-term evolution (trend)	Trend > 0.5 mm/yr	Trend > 0.1 mm/yr	Trend < 0.1 mm/yr
	Periodic Signals	Amplitude > 5 mm	Amplitude > 0.5 mm	Amplitude < 0.5 mm
Mesoscale	Signals < 2 months	Crossovers Variance Differences > 1 cm^2	Crossovers Variance Differences > 0.2 cm^2	Crossovers Variance Differences < 0.2 cm^2

Selected altimeter standards in SL_cci phase 1

	ERS-1	ERS-2	EN	T/P	J1	J2	GFO
Orbit	Reaper	Reaper	GDRD		GDRD	GDRD	
Major Instrumental correction			PTR				
Sea State Bias			2007				
Ionosphere	Reaper		Rep.				
Wet troposphere			GPS-based				
Dry troposphere	Era Interim based						
Combined atmospheric correction	Era Interim based						
Ocean tide	GOT 4.8						
Solid Earth tide							
Pole tide							
MSS	DTU10						
Merging algorithms	New regional biases and monthly OI						

Selected altimeter standards in SL_cci phase 2

	Reference missions			Complementary missions					
	TOPEX	Jason-1	Jason-2	ERS-1	ERS-2	Envisat	GFO	Altika	Cryosat
Orbit solutions									
Ocean tides									
Wet troposphere									
Sea State Bias									
Ionosphere									
Dry troposphere									
Comb. Atm. cor.									
Ocean tide									
Solid Earth tide									
Pole tide									
Mean Sea Surface									
L2 products									

To be filled during the selection meeting

RRDP and synthesis validation reports

Standard	Description	Missions	Documents	Work Package
Orbit	GFZ vs REF	TP, J1, J2, E1, E2, EN	RRDP_WP2120_Impact_of_Orbit_GFZ_from_REF_2015-08-07.pdf WP2120_Impact_of_Orbit_GFZ_from_REF_E1.pptx WP2120_Impact_of_Orbit_GFZ_from_REF_E2.pptx WP2120_Impact_of_Orbit_GFZ_from_REF_EN.pptx WP2120_Impact_of_Orbit_GFZ_from_REF_J1.pptx WP2120_Impact_of_Orbit_GFZ_from_REF_J2.pptx WP2120_Impact_of_Orbit_GFZ_from_REF_TP.pptx WP2120_Synthesis_Impact_of_Orbit_GFZ_from_REF.pptx	WP2120
	GSFC std12 vs REF	TP, J1, J2	RRDP_WP2110_Impact_of_Orbit_GSFC_STD1204_from_REF_2015-11-10.pdf	WP2110
	GSFC std 15 vs REF	TP	RRDP_WP2110_Impact_of_Orbit_GSFC1504_from_GSFC1204_TP_2015-11-10.pdf	WP2110
	POE-E vs REF	J1, J2, AL, C2	RRDP_WP2110_Impact_of_Orbit_POE-E_from_GDR-D_J1_2015-11-10.pdf RRDP_WP2110_Impact_of_Orbit_POE-E_from_POE-D_AL_2015-11-10.pdf RRDP_WP2110_Impact_of_Orbit_POE-E_from_POE-D_C2_2015-11-10.pdf RRDP_WP2110_Impact_of_Orbit_POE-E_from_POE-D_J2_2015-11-10.pdf WP210_Impact_of_Orbit_POE-E_from_GDR-D_J1.pptx	WP2110
Ocean Tide	GOT4v10 vs REF (GOT4v8)	J1, J2, EN	RRDP_WP2110_Impact_of_OceanTide_GOT4V10_from_GOT4v8_2015-11-10.pdf	WP2110
	FES2014 vs REF (GOT4v8)	J1, EN	RRDP_WP2110_Impact_of_OceanTide_FES2014_from_GOT4v8_2015-11-10.pdf WP2110_Impact_of_Tide_FES2014_from_GOT4V8_EN.pptx WP2110_Impact_of_Tide_FES2014_from_GOT4V8_J1.pptx	WP2110
	FES2014 vs GOT4v10	J1, EN	RRDP_WP2110_Impact_of_OceanTide_FES2014_from_GOT4v10_EN_2015-11-10.pdf RRDP_WP2110_Impact_of_OceanTide_FES2014_from_GOT4v10_J1_2015-11-10.pdf	WP2110

RRDP and synthesis validation reports

Standard	Description	Mission	Document	Work Package
Wet Tropo.	ERA-Int vs ECMWF ope 2014	EN, J1, J2	RRDP_WP2110_Impact_of_WetTropo_ERA_Interim_from_ECMWF_OPE_2014_2015-11-10.pdf	WP2110
	Rad. P3 vs Rad. P2	AL	RRDP_WP2110_Impact_of_WetTropo_Rad_Patch3_from_Rad_Patch2_AL_2015-11-10.pdf	WP2110
	GPD 1.1 vs Rad. (Extensions 2013,2014)	EN, J1, J2	RRDP_WP2410_Impact_of_WTC_GPD_V1_1_from_Rad_2015-11-10.pdf	WP2410
	GPD 1.1 vs ERA	TP, J1, J2, E1, E2, EN	RRDP_WP2410_Impact_of_WTC_GPD_V1_1_from_ERA_Interim_2015-11-10.pdf	WP2410
	GPD 2.0 vs V1.1	TP, J1, J2, E1, E2, EN	RRDP_WP2410_Impact_of_WTC_GPD_V2_0_from_GPD_V1_1_2015-11-10.pdf WP2410_Impact_of_WTC_GPD_V2_from_GPD_V1_E1.pptx WP2410_Impact_of_WTC_GPD_V2_from_GPD_V1_E2.pptx WP2410_Impact_of_WTC_GPD_V2_from_GPD_V1_EN.pptx WP2410_Impact_of_WTC_GPD_V2_from_GPD_V1_J1.pptx WP2410_Impact_of_WTC_GPD_V2_from_GPD_V1_J2.pptx WP2410_Impact_of_WTC_GPD_V2_from_GPD_V1_TP.pptx WP2410_Synthesis_Impact_of_GPD_V2_from_V1.1.pptx	WP2410
	GPD 2.0 vs ERA	TP, J1, J2, E1, E2, EN, AL, C2	RRDP_WP2410_Impact_of_WTC_GPD_V2_0_from_ERA_Interim_2015-11-10.pdf	WP2410
	GPD 2.0 vs Rad.	TP, J1, J2, E1, E2, EN (V2.1b, V3), AL	RRDP_WP2410_Impact_of_WTC_GPD_V2_0_from_Radiometer_2015-11-10.pdf RRDP_WP2410_Impact_of_WTC_GPD_V2_0_from_Radiometer_V3_EN_2015-11-10.pdf WP2410_Impact_of_WTC_GPD_V2_from_RAD_AL.pptx	WP2410
	GPD 2.0 vs ECMWF ope	J2, C2	RRDP_WP2410_Impact_of_WTC_GPD_V2_0_from_ECMWF_OPE_2015-11-10.pdf	WP2410

RRDP and synthesis validation reports

Standard	Description	Missions	Documents	Work Package
Dyn. Atm.	JRA-55 vs ERA-Int (IB)	TP, J2, E2, EN	RRDP_WP2420_Impact_of_DynAtmo_InvertBaro_JRA-55_from_ERA_Interim_2015-11-10.pdf WP2420_Impact_of_IB_JRA-55_from_ERA_Interim_E2.pptx WP2420_Impact_of_IB_JRA-55_from_ERA_Interim_EN.pptx WP2420_Impact_of_IB_JRA-55_from_ERA_Interim_J2.pptx WP2420_Impact_of_IB_JRA-55_from_ERA_Interim_TP.pptx	WP2420
	ERA-Int vs ECMWF ope 2014	EN, J1, J2	RRDP_WP2110_Impact_of_DynAtmo_ERA_Interim_from_ECMWF_OPE_2014_2015-11-10.pdf	WP2110
Dry Tropo.	JRA-55 vs ERA-Int	TP, J2, E2, EN	RRDP_WP2420_Impact_of_DryTropo_JRA-55_from_ERA_Interim_2015-11-10.pdf WP2420_Impact_of_DTC_JRA-55_from_ERA_Interim_E2.pptx WP2420_Impact_of_DTC_JRA-55_from_ERA_Interim_EN.pptx WP2420_Impact_of_DTC_JRA-55_from_ERA_Interim_J2.pptx WP2420_Impact_of_DTC_JRA-55_from_ERA_Interim_TP.pptx	WP2420

RRDP and synthesis validation reports

Standard	Description	Mission	Document	Work Package
Iono.	Delta iono IsardSat vs REF	EN	RRDP_WP2130_Impact_of_Iono_CorrIsardSat_from_REF_EN_2015-11-10.pdf WP2130_Impact_of_DeltaIonoKu_CCI_from_REF_ENVISAT.pptx	WP2130
	Delta iono IsardSat vs GIM	EN	RRDP_WP2130_Impact_of_Iono_CorrIsardSat_from_GIM_EN_2015-11-10.pdf	WP2130
	Sloop filter vs REF	TP, J1, J2, EN	RRDP_WP2110_Impact_of_Iono_SLOOPFilter_from_REF_EN_2015-11-10.pdf RRDP_WP2110_Impact_of_Iono_SLOOPFilter_from_REF_J1_2015-11-10.pdf RRDP_WP2110_Impact_of_Iono_SLOOPFilter_from_REF_J2_2015-11-10.pdf RRDP_WP2110_Impact_of_Iono_SLOOPFilter_from_REF_TP_2015-11-10.pdf	WP2110
SSB	PEACHI 2015 3D vs GDR-D	AL	RRDP_WP2110_Impact_of_SSB_PEACHI2014_2D_from_GDR-D_AL_2015-11-10.pdf	WP2110
	PEACHI 2014 2D vs GDR-D	AL	RRDP_WP2110_Impact_of_SSB_PEACHI2015_3D_from_GDR-D_AL_2015-11-10.pdf	WP2110
	Tran 2012 vs GDR-D	J1, J2	RRDP_WP2110_Impact_of_SSB_Tran2012_from_GDR-D_J1_2015-11-10.pdf RRDP_WP2110_Impact_of_SSB_Tran2012_from_GDR-D_J2_2015-11-10.pdf	WP2110
	Tran 2015 vs Tran 2012	EN	RRDP_WP2110_Impact_of_SSB_Tran2015_from_Tran2012_EN_2015-11-10.pdf	WP2110
Pole Tide	Desai 2015 vs Wahr 1985	EN, J1	RRDP_WP2110_Impact_of_PoleTide_DESAI2105_from_Wahr1985_2015-11-10.pdf	WP2110

Agenda – Part 1 (Thursday morning)

- **9:00-9:15: Introduction** **(CLS, 15')**
  Introduction, selection strategy

- **09:15-10:00:** Selection of Orbit solutions **(GFZ+CLS, 45')**
  GFZ Orbit solutions
  External orbit solutions (POE-E CNES, GSFC Std15)

- **10:00-10:30:** Selection of Atmospheric corrections (DAC & DT) **(CLS, 30'**)
  ERA-interim extension (2011-2014)
  JRA-55 reanalysis

- **10:30-11:00 Coffee break**

- **11:00-12:00:** Selection of Wet troposphere corrections **(UoP+CLS, 60')**
  GPD plus
  ERA-interim extension
  External corrections: Radiometer corrections reprocessing

- **12:00-12:30:** Selection of Instrumental corrections **(IsardSAT+CLS, 30')**
  Ionosphere correction (Envisat)
  External corrections: new filtering iono, SSB (Jason-2, Jason-1)

- **12:30-14:00 Lunch**

Agenda (Afternoon)

- **14:00-14:45:** Selection of tide models **(DTU+CLS, 45')**
  Arctic ocean tide model (DTU solution)
  External corrections : FES2014, GOT4.10, new polar tide correction

- **14:45-15:15:** Selection of Mean Sea Surface **(DTU, 30')**
  DTU15 and others

- **15:15-15:30:** Selection of new Level-2 products **(CLS,15')**
  TOPEX RGDR
  Jason-1 GDR-E
  ERS1/ERS2 REAPER products

- **15:30-16:00 Coffee break**

- **16:00-17:30: Selection of Arctic Sea Level products** **(DTU, PML, CLS, 90')**
  DTU analyses
  CLS analyses
  PML analyses

- **19:45 – Hosted dinner**

Agenda (end)

- **8:30-9:15 Selection of new algorithms in coastal areas** **(NOC+PML, 45')**
  Improvement of altimeter corrections in coastal areas
  Total relative Sea level at the coast
  NOC/PML option task

- **9:15-10:00:** **Conclusion of selection meeting** **(All, 45')**
  Choice of new altimeter standards for the global product
  Choice of regional Arctic products