

Science Leaders' Discussion

Introductions, agenda and expectations

Broad thinking

Science opportunities

Aspirations and plans for Phase 2

FP7 / GMES and long term positioning

Specific thinking

Co-ordination to further programme goals and impact

“Impacts” agenda for MTR

Recommendations for next collocation / CMUG meetings

Recommendations for Phase 2 SoW and programme

Review actions / recommendations

BAMS paper

Cluster discussions

Thematic presentation of programme at Colloc3/MTR

Science Opportunities

(exploiting but beyond CCI programme)

- Hydrological cycle
 - **Soil moisture** (feedback to **clouds**)
 - **Inland water**
 - **Sea-ice, Glaciers, Ice sheet** (Greenland), snow cover
 - Precipitation
- Aerosol interactions with other ECVs
 - **Ocean colour + SST → Aerosol → Clouds**
- Carbon Cycle
 - **GHGs**
 - **Soil moisture**

Science Opportunities

(exploiting but beyond CCI programme)

- “Arctic Ocean in with decreasing sea ice”
 - **OC** (Phytopl.) and **SST** response
 - Radiation budget
- Asymmetric climate signal between Arctic and Antarctic.
- **Soil moisture \leftrightarrow Fires**
 - Alaskan wild fires with soil moisture – indicator of negative mass balance for nearby and glaciers?

Science Opportunities

(exploiting but beyond CCI programme)

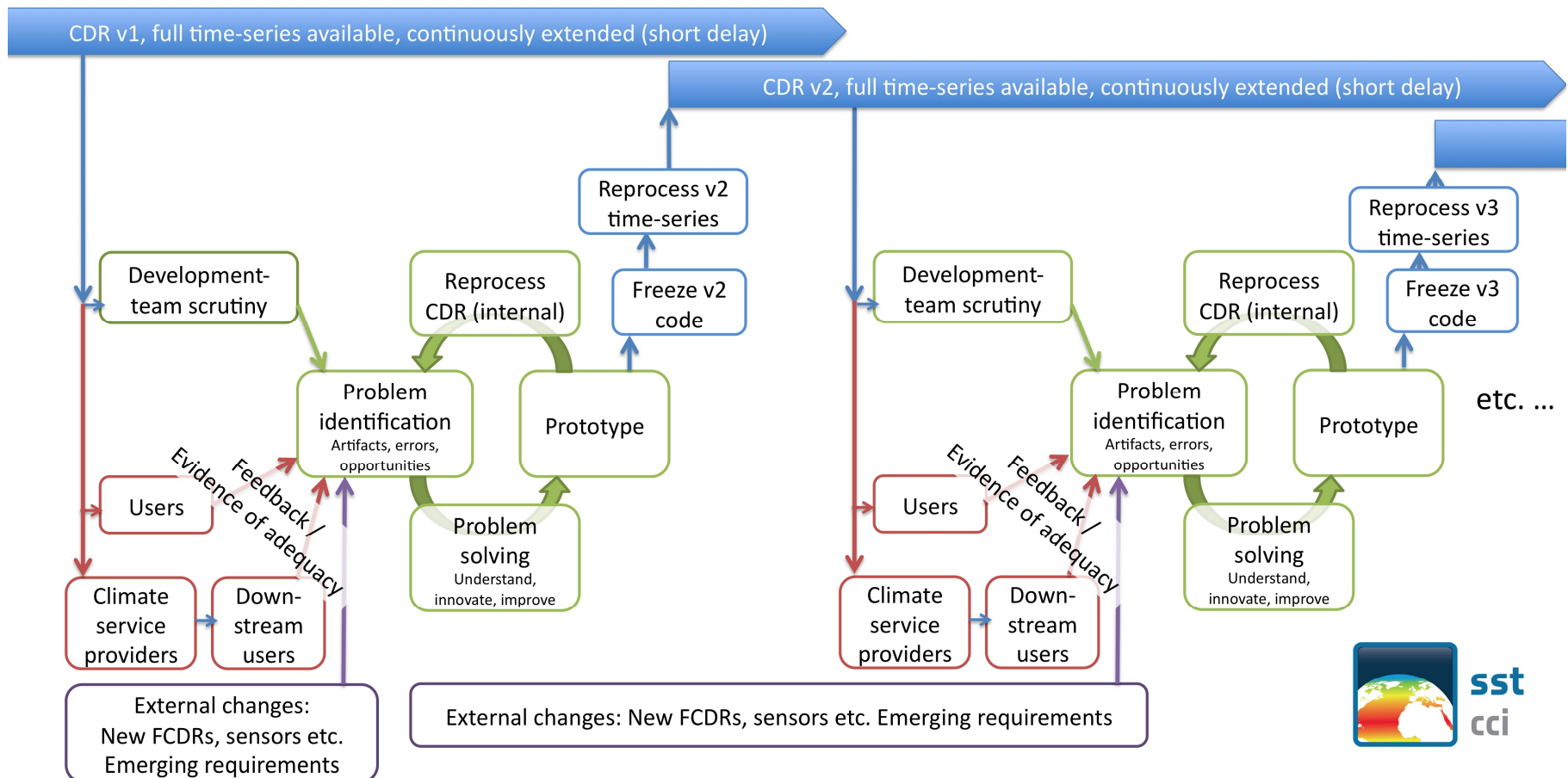
- Fire Linkages
 - **CO₂, CH₄, O₃**
 - **Aerosol**
 - **Land cover (change)**
 - **SST (seasonal prediction)**
 - **Soil moisture**
 - **Glaciers?**
- Food security - soil moisture, land cover, fires.

Aspirations for Phase 2

Two broad classifications

“Climate Service Mode”

“Climate data record mode”



Aspirations for Phase 2

Two broad classifications

“Climate Service Mode”

- Soil Moisture
- SST
- Sea Ice
- GHGs? Clouds?
- *Fire*
- *Ocean Colour*
- *Sea Level*

“Climate data record mode”

- Landcover
- Ice sheets
- Glaciers
- Ozone
- Aerosol

Aspirations for Phase 2

- General concern to ensure sensible balance of resources between science / engineering / documents
- “Science-driven” implies science resource
 - Documentation in Phase 1 goes beyond the useful
- Recommendation: find the minimum useful document set (talk to us)
- Recommendation: facilitate peer reviewed publication

Aspirations for Phase 2

- Recommendation: cross-ECV working groups need to be properly instituted and resourced from start
- Recommendation: mechanism for cross-ECV work needs to be designed and honoured
- Does it *really* have to be an ITT? Is any less onerous process possible?
- Recommendation: Contingency budget is useful and should be norm
- Action: 2 or 3 projects to follow up level 1 issues with ESA
 - nature of data -- restriction to European sensors

Aspirations for phase 2

- **Aerosol** - time series of all ATSR/SLSTR+MODIS/VIIRS+MERIS/OLCI
- **Fire** – extend time series back to 15 years, based on further algorithm development
- **Land Cover** – extend by including AVHRR back to 1992 and develop land cover *change* products
- **Ozone** – Make full time series from ESA sensors and make link with US datasets back to 1980s + deal impact of loss of ENVISAT and limb data.

Aspirations for phase 2

- **Clouds** - 1982 – 2014 (AVHRR, MODIS, AATSR) provide cloud masking information to other ECVs CDR mode
- **GHG** – 2003 – 2105 Sciamachy, GOSAT, (OCO-2, S-5 precursor, GOSAT-2). CDR + Climate Service mode for MACC.
- **Ocean Colour** – 1997-2016 OLCI, OCM-2, MERIS etc

Aspirations for phase 2

- **SST** – 1979 – 2016 (AVHRR, ATSR, SLSTR, Metop/IASI ...) – full scenario in SRD. Exploit higher level products and uncertainties.
- **Glaciers** – Glacier velocity and elevation change from altimetry. Improvement of global inventory. Possibly Sentinel-2 / Landsat Data Continuity, Cryosat data and global Tandem-X DEM.
- **Sea-ice** – More parameters - ice drift enabling icea fluxe. Homogeneous, exploit Cryostat and prepare for Sentinel-3. Vis/IR data for temperature and albedo.

Aspirations for phase 2

- **Ice sheets** – Cryosat and Sentinel-1/3. Velocity maps for more epochs. Want a whole new ECV project for Antarctica.
- **SSH** – 1982 – 2016, improve atmospheric correction etc via RR. Arctic Ocean focus. HY-2A, Cryosat, Altika, Sentinel-3.
- **Soil moisture** – Extend to METOP-B and AMSR-2, SMOS, SMAP, Aquarius.

FP7/GMES and long term opportunities

Future FP7 calls:

- Reanalysis, generation of new ECV datasets (not in CCI), QA for multi-decadal datasets, climate related ocean processes.
- Contribution to assessment of global water resources through use of EO data modelling and analysis.

Action: keep each other informed of news and drafts

GMES climate services

CCI vs. ERA CLIM, MACC and MyOcean-2 reanalysis and input to seasonal and climate models.

Positioning – some national positioning, but CCI programme positioning unclear

Message: not collectively sure what can / should be done now, underinformed

Co-ordination to further programme goals and impact

- Co-ordination within Europe on each ECV is already a huge benefit.
- Look beyond CMUG for users.
- Simple steps: e.g., cohere grid selection for marine L4; assess land-cover glacier consistency, etc
- Obs4MIPS
- Action: projects interested in creating obs4MIPS submission to contact RS / CM for co-ordinated CCI interaction

Input to agenda for Coloc-3/MTR

- “Brainstorming time” highly valued
 - needed to exploit full potential of CCI beyond the CCI deliverables.

Recommendation: at Colocations generally ensure half-day for SL interactions provided

Recommendation Coloc-3: Monday or Tuesday a.m. SL brainstorming. Wednesday p.m. final “peer review” of MTR presentations (with ESA).

Recommendation: lively professional graphics will help communicate

Input to agenda for Coloc-3/MTR

- Recommendation: At Coloc-3/MTR, themed presentations of programme rather than series of each ECV
- Trick here is to find a set of themes that:
 - speak to delegates
 - ensure visibility of all ECVs

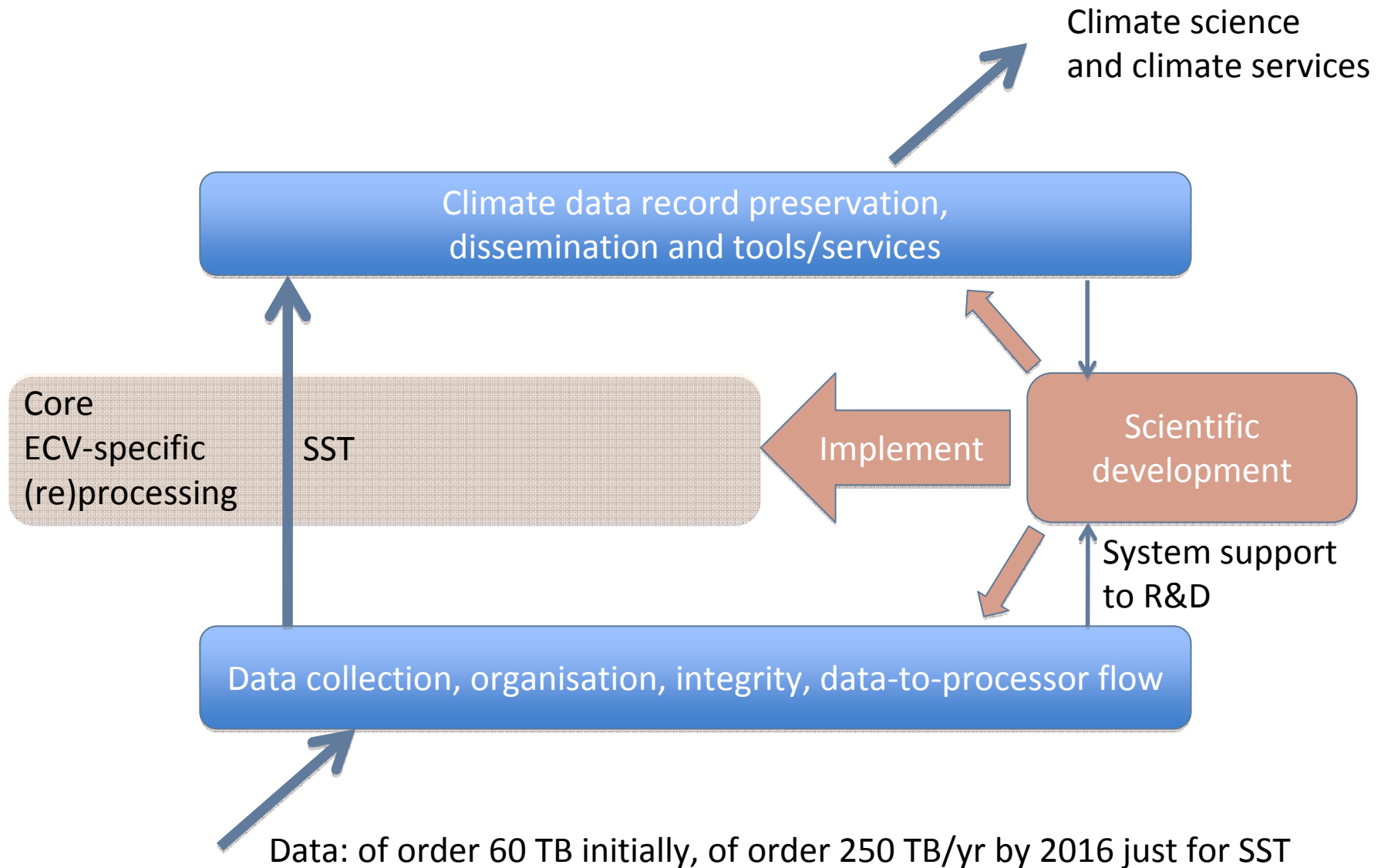
Possible Themes for MTR/Colocation

- Science Themes
 - Arctic Change
 - Confrontation of data and models
 - Carbon cycle
 - Chemistry and climate
 - Hydrology
- Programme success themes
 - International co-operation
 - Algorithm progress
 - User engagement
 - Data vs. models
 - CRGs
- Structured around AR5 report structure
 - 70% ‘what achieved’
 - 30% ‘future’
- Additional messages
 - Continuity of observations / Sentinels
 - AR5 relevant contributions
 - CCI programme benefits (modellers, multi-ECV)
 - Accessibility of CCI

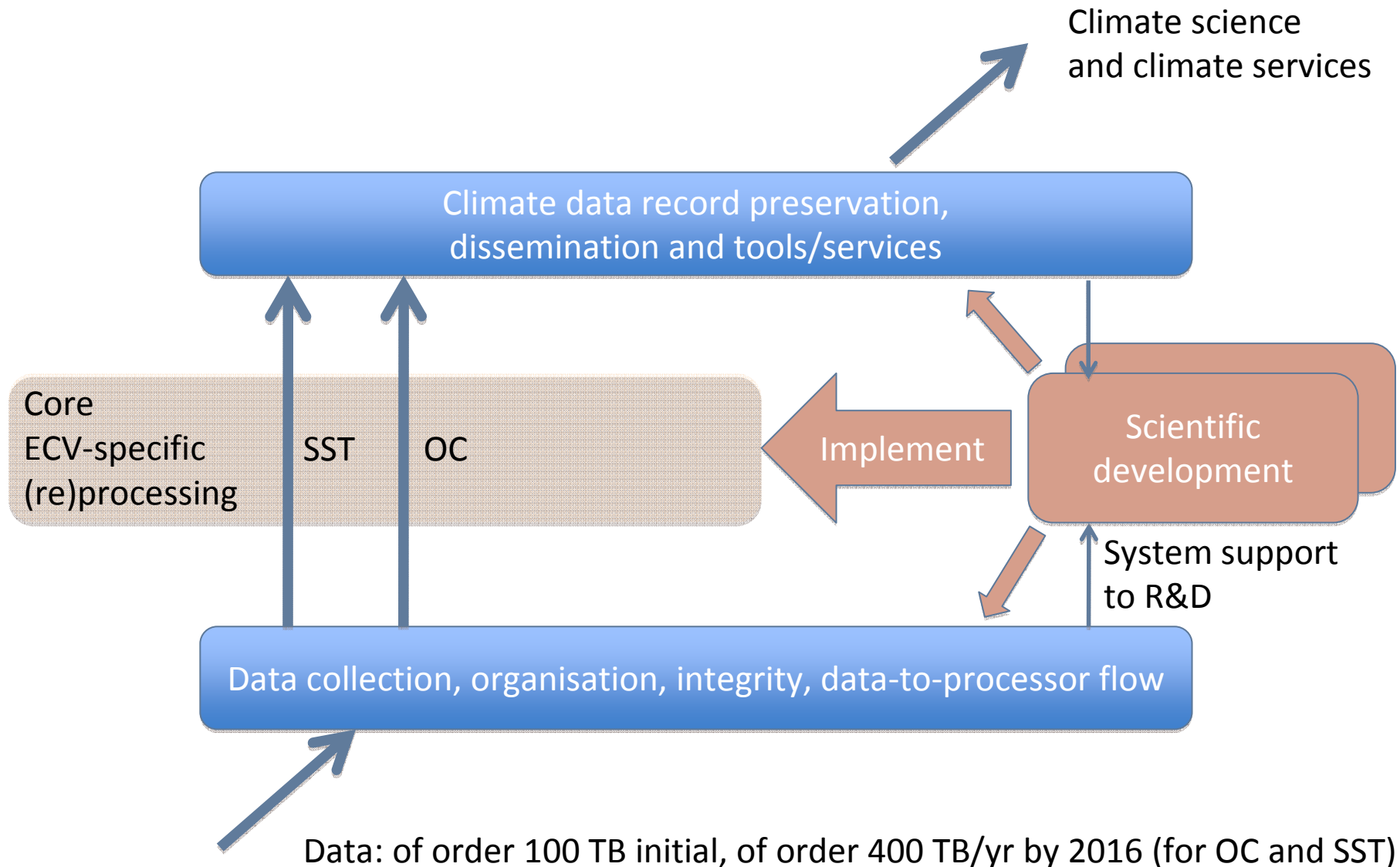
Integration meetings

- Recommendation: Provide new opportunities for dialogue with modellers at next Integration meeting.
- Recommendation: at Integrations ensure full-day available for SL discussions

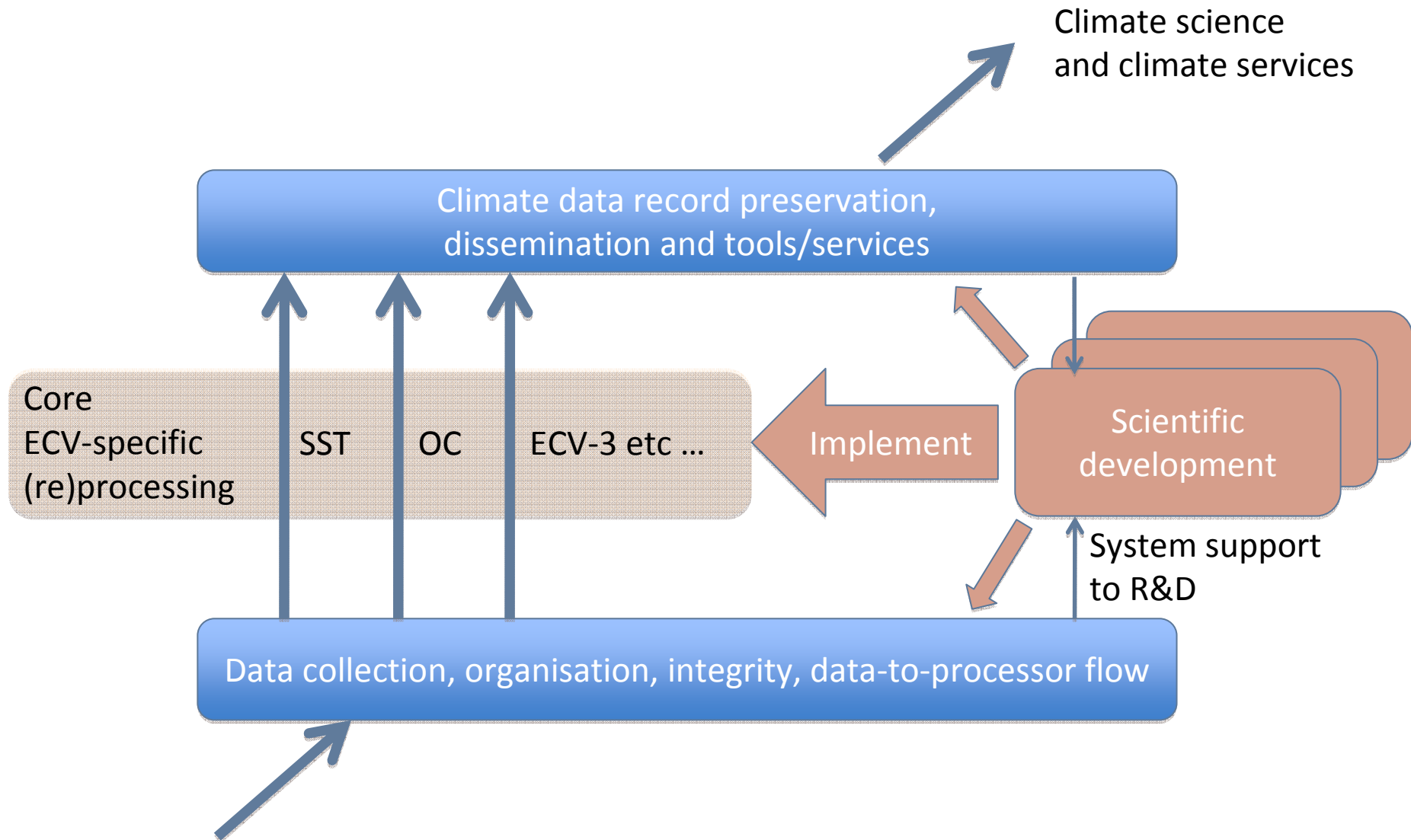
A complementary system view



A shared system SST & OC



A bigger cluster?



System options in Phase 2

- Concern about possible industry/science split being driven by national delegates
- ITTs will be issued for phase 2 for each ECV
- Nonetheless, ECV clusters can be formed for parts of the IT infrastructure

Recommendation: need absolute clarity on how to achieve this contractually

- Thematic clusters don't deliver efficiencies as effectively as ECVs with common sensors ...
- ... but can make a nice 'story'
- A CCI product stewardship facility ('one-stop shop') needed to maximise multi-ECV exploitation

Cluster Options in which SLs expressed interest

- Radar altimetry: Sea-ice, sea-level, glaciers, ice sheets
- Sentinel3: SST, ocean colour, clouds, aerosols, *ozone*, *GHGs*
- Landsat: Land cover, Fire, Glaciers
- SAR: Inland water, sea-ice, glaciers, ice sheet

Action: “straw man” cluster concept for each of above: AS, CM/SS, PdF, SS by end July

Cluster Options - Thematic

Marine

- SST, Ocean Colour, Sea Ice, Sea Level, Aerosols

Hydrology

- Soil Moisture, sea-level, glaciers, sea-ice, clouds, inland water

Chemistry

- GHG, O₃, fire, aerosols, SST, sea-ice

Carbon cycle

- GHG, fire, aerosols

Arctic

- Sea-ice, SST

Actions/Recommendations

- Action(All) to discuss issue of efficiency links with other ECVs with ESA for phase 2 proposals.
- Recommend: Some issues of level 1 data processing need to be set up properly at start.
- Action(SS/RH): Share EU FP7 calls to science leads and try and set up grouping.
- Action(All): For groups to provide Obs4MIP datasets and make a collective approach to contact Chris Merchant and Roger Saunders.
- Action(All): Send Pascal ideas for any graphics needs for each project or topics for mid term review
- Action(All): CCI projects to get early datasets out and count number of users note European influence gained (eg appointed to International groups) and make case studies of recent events.
- Recommendation: Every colocation meeting should have time for half a day of dedicated discussions (e.g. before Coloc meeting). For Integration meeting 1 day for science leads discussions.
- Recommendation: Provide new opportunities for dialogue with modellers at next Integration meeting.

Actions/Recommendations

- Recommendation: At MTR/Colocation 3 instead of 1 ECV presentation after another propose to have a topic based agenda
- Recommendation: That SOW and annexes should be consistently structured and that there is some prioritisation of tasks in annexes.
- Recommendation: In proposal make it clear what is saving due to sharing of any IT facility with other ECV teams and include a conditional WP.
- Action: To discuss sensor cluster interactions at Coloc-3 in sub-groups.
 - Radalt (AS)
 - Sentinel 3 (SS/CM)
 - SAR (SS/WW)
 - Landsat (PdF)
- Action on each of above: Provide some introductory text on each possible cluster interactions
- Action (RS/RH/CD) Submit BAMS CCI paper after comments