Minutes for the SMOS Data Assimilation Study
meeting 05.09.2014

The meeting was held on 5 September at ECMWF with the following participants:
ESA: Matthias Drusch (MD), Susanne Mecklenburg (SM, teleconf)
CESBIO: Nemesio Rodriguez (NR), Yann Kerr (YK, teleconf)
ECMWF: Patricia de Rosnay (PdR), Joaquín Muñoz Sabater (JMS), Lars Isaksen (LI), Steve
English (SE), Anton Beljaars (AB), Magdalena Alonso-Balmaseda (MAB), Steffen
Tiesche (ST)

Agenda:
09.00-09.15   Matthias, mission status
09.15-09.40   SMOS contract status: Patricia
09:40-09.55   Technical work / monitoring / deliverables: Joaquín
09.55-10:20   Coffee Break
10:20-12:00   Work on SMOS: Joaquín
              - SLV and SMOS assimilation experiments
              - Model and observation errors scenarios (WP-3401/3402)
12.00-12.45   CCN proposal: Patricia, and discussion
12.45-13.45   Lunch
13.45-15.00   Neuronal Network discussion (presentation by Nemesio)
15.00-15.30   Coffee break
15:30-17:00   Teleconference with Susanne and CESBIO (summary, discussion)

Presentations and minutes of the meetings as well as project related documents are available
at this web page:
https://software.ecmwf.int/wiki/display/LDAS/SMOS+Project+Documents
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<th>Item #</th>
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<th>Results of Discussion</th>
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<tr>
<td>[1]</td>
<td>Introduction and agenda</td>
<td>B PdR</td>
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<td>[2]</td>
<td>Presentation by Matthias Drusch SMOS mission status</td>
<td>B MD</td>
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<td>[3]</td>
<td>Reprocessing campaign (2010 onward), processor v620; product will be available in 2015</td>
<td>B MD</td>
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<td>[4]</td>
<td>SMOS extension until February 2017</td>
<td>B MD</td>
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<td>[5]</td>
<td>Synergy between SMOS and SMAP, S1 (soil moisture), S2 (land cover) motivate SMOS extension. Also motivated by times series, CCI, merged products and operational activities</td>
<td>B MD</td>
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<td>[6]</td>
<td>ISSI workshop in September. And SE will attend and present ECMWF SMOS activities. MD: It would be actually useful to have ECMWF presentation a bit broader than SMOS.</td>
<td>B MD, SE</td>
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<td>[7]</td>
<td>Presentation by Patricia de Rosnay Current contract status (Main contract and CCN1&amp;2)</td>
<td>B PdR</td>
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<td>[8]</td>
<td>WP 2100 (Root Zone Product) is completed. ECMWF needs some input from ESA to define the product dissemination (name, unit, number of layers, ftp site etc).</td>
<td>B PdR, JMS, MD</td>
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</table>
| [9]   | Re-send to MD the RZSM product definition email
MD clarifies the RZSM product characteristics for dissemination
JMS send the RZSM to ESA                                                                                                                                 | AI-01 PdR Done MD November JMS November                                               |
| [10]  | All WPs of the main contract and CCN1&2 are completed. Updates on WP2000 and WP2100 and work on WP3401 and WP3402 will be presented by JMS later.                                                                       | C PdR                                                                               |
| [11]  | A number of WPs reports were sent from ECMWF to ESA with no feedback. ESA feedback and approval is needed to close the corresponding WPs.                                                                          | C PdR, JMS                                                                          |
| [12]  | MD agrees and ask JMS to resend the DLs                                                                                                                                                                           | C MD                                                                                |
| [13]  | Re-send the reports to MD
MD gives his feedback to the reports                                                                                                                                                                           | AI-02 JMS MD Done September                                                         |
<p>| [14]  | There is confusion with the CCN numbering.                                                                                                                                                                        | B PdR, MD                                                                           |</p>
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<td>CCN3 at no COST (March to June 2014) was signed by ECMWF but not by ESA. And ESA request for CCN3 should be request for CCN4. To be clarified in the afternoon with SM.</td>
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<td>The slope BC parameter tends to be lower than 1, indicating less temporal variability in simulated TB than in observed TB. This can be due to LSM of CMEM or both.</td>
<td>C MD</td>
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<td>Consistent with variance statistics (higher for SMOS than CMEM) and sampling depth difference with H-TESSEL 7cm layer thicker than SMOS sampling</td>
<td>C PdR</td>
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<td>Enhanced soil vertical resolution in H-TESSEL is foreseen to be developed in the near future</td>
<td>C AB</td>
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<td>It would be useful to see if ASCAT CDF matching parameter also tend to have a slope lower than 1</td>
<td>B all</td>
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<td>Checks ASCAT CDF matching slope parameter. ASCAT slope parameter is also &lt; 1, confirming the soil moisture variability explanation.</td>
<td>AI-03 PdR Done</td>
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<td>Global soil moisture increments for the three experiments are different. However, the shown tables need further clarification. It would be more relevant to give global mean total increments (water budget component) and standard deviation.</td>
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<td>Clarify the global mean accumulated increments and their standard deviation</td>
<td>AI-04 JMS Done</td>
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<td>The three global scale experiments show that: - SMOS DA improves soil moisture - the SMOS observation error used in the DA system produces large increments and it needs to be revised with a different configuration - In average at global scale, the combination of SLV+SMOS provides the best results.</td>
<td>C JMS</td>
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<td></td>
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<td>Presentation by Joaquin Munoz Sabater on WPs 3401 and 3402 (on errors specifications)</td>
<td>C JMS</td>
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<td>A set of experiments were conducted to address background error configuration</td>
<td>C JMS</td>
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<td>- B fixed value and B propagated along the assimilation window</td>
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<td>- B depends on soil texture</td>
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<td>- B decreasing at depth</td>
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<td>And observation error configuration:</td>
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<td>- R, or R multiplied by 2, or pseudo-insertion of observations</td>
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<td>[27]</td>
<td>Texture is the most important component that affects soil moisture B error. Vegetation effect would be relevant for B TB error, but here B is for soil moisture.</td>
<td>JMS, NR, PdR</td>
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<td>[28]</td>
<td>Best configurations for soil moisture are when they depend on the texture</td>
<td>JMS</td>
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<td>[29]</td>
<td>These results give indication of the best configuration to use for future DA experiments. There is a good probability that the combined effect of doubling the error of the SMOS observations and a B matrix as a function of soil texture will produce better results both, in terms of lower RMSD and higher R with in-situ data. However, these configurations need to be tested.</td>
<td>C JMS</td>
<td></td>
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<td>[30]</td>
<td>Presentation by Patricia de Rosnay, CCN Proposal for the next 18 months</td>
<td>PdR</td>
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<td>[31]</td>
<td>32 PM project</td>
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<td>- 12 PM ECMWF soil moisture</td>
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<td>- 12 PM ECMWF Ocean</td>
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<td>- 6PM for VS study at ECMWF</td>
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<td>- 2PM for CESBIO</td>
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<td>[32]</td>
<td>Start date should be 1 September CCN3 at no COST for Feb-Aug 2014 CCN4 (numbering for the new contract. To check with SM during telecom (see later)</td>
<td>B PdR, MD</td>
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<td>[33]</td>
<td>Priority to WP 4020 (NRT soil moisture processing chain). JMS will go on mission to CESBIO for 1 week to work on the NN input preparation from the NRT TB.</td>
<td>B all</td>
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<td>[34]</td>
<td>The proposed schedule accounts for the fact that CESBIO and ECMWF have to interact on WP4020 (NRT processing chain).</td>
<td>D all</td>
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<td><strong>ECMWF WP4020 activity will be in Sep-Oct 2014 and Jan-Feb 2015, so that CESBIO has time to interact in Nov-Dec. ECMWF WP4040 will be conducted in Nov-Dec 2014 and Mar-Jun 2015</strong></td>
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<td>35</td>
<td>VS activity: NR is interested to work on the VS WP for 6 months in 2015. Period needs to be defined. ECMWF interested by NR. This needs to be discussed with LERMA as well since they also have a candidate. Important to actively collaborate with both LERMA and CESBIO on the VS activity. MD: during the VS CESBIO and LERMA will be invited to ECMWF meeting.</td>
<td>B NR, PdR, MD</td>
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<td>36</td>
<td>VS skills will be specified in the ESA-ECMWF contract</td>
<td>B all</td>
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<td>37</td>
<td><strong>Indicate what period would be convenient for the 6months VS</strong></td>
<td>AI-05 NR October Done</td>
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<td></td>
<td>Contact LERMA to discuss the VS candidates and indicate the ECMWF is interested by NR to do this work. Done, very positive feedback for Filipe Aires, very keen on starting to collaborate with ECMWF and CESBIO on this WP.</td>
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<td>38</td>
<td>Presentation by Nemesio Rodriguez SMOS + NN activities</td>
<td>C NR</td>
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<td>39</td>
<td>NN configuration still needs to be decided. Trade-off between resolution and accuracy (number of TB to use). Soil Texture is important to retrieve SM for ECMWF. NDVI information is also very important to account for. For both WP410 and WP4020, the NN configurations need to be discussed and defined (see later).</td>
<td>B all</td>
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<td>40</td>
<td>CESBIO contribution: CESBIO could be co-contractor instead of sub-contractor.</td>
<td>C MD</td>
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<td>41</td>
<td>For ECMWF it will be simpler.</td>
<td>C PdR</td>
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<td>42</td>
<td>Reports to be done by CESBIO?</td>
<td>C NR</td>
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<tr>
<td>43</td>
<td>No, deliverables still are responsibility of ECMWF</td>
<td>MD</td>
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<td>44</td>
<td>Telecon with SM and YK</td>
<td>B all</td>
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<td>[45]</td>
<td>SM agrees to extent the CCN3 at no COST until August 2014. SM also agrees to start CCN4 (revised numbering compared to SoW and proposal) on 1st September 2014. CCN4 will last until February 2016.</td>
<td>D</td>
<td>SM</td>
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<tr>
<td>[46]</td>
<td>Contact Benjamin Jeusset to redo CCN3 at no cost for Feb-Aug 2014 Prepare request for clarification for CCN4 proposal.</td>
<td>AI-06</td>
<td>MD</td>
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<td>[47]</td>
<td>SM clarifies that the new processor (v620) will be used from Q1 2015 in operations to deliver NRT product. It will improve RFI detection.</td>
<td>C</td>
<td>SM</td>
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<td>[48]</td>
<td>WP4040 of CCN4: DA periods should be MJJA 2012 and MJJA 2013, so that the reprocessed data can be used.</td>
<td>D</td>
<td>all</td>
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<tr>
<td>[49]</td>
<td>Ask the team to send reprocessed data to ECMWF Ask ECMWF acquisition team to prepare for MJJA 2012-2013 acquisition</td>
<td>AI-07</td>
<td>SM</td>
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<td>[50]</td>
<td>WP4020: NRT processing chain set-up: MD summarises to YK and SM the previous discussion on the NN configuration. It is important to define the NN configuration according to ECMWF constraints and trade-off between swath and accuracy (see above). SM: the NRT L2 soil moisture needs to be as close as possible to the level2 product.</td>
<td>B</td>
<td>YK,SM, MD</td>
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<tr>
<td>[51]</td>
<td>ECMWF and CESBIO need to prepare a document to define the configuration of the NRT NN</td>
<td>AI-08</td>
<td>JMS, NR, PdR, YK</td>
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<td>[52]</td>
<td>Discussion on WP4050</td>
<td>B</td>
<td>MD, MAB, ST</td>
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<td>[53]</td>
<td>RZSM product discussion</td>
<td>B</td>
<td>all</td>
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<td>[54]</td>
<td>RZSM product specifications will be discussed at the Carbon workshop in November. This applies to the ECMWF RZSM as well as for the CATDS product.</td>
<td>AI-09</td>
<td>YK, MD</td>
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<td>[55]</td>
<td>MD: a standard set of diagnostic would be relevant to use for the DA experiments analysis.</td>
<td>MD, JMS</td>
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<td>[56]</td>
<td>JMS: to send an inventory of all diagnostics tools used at ECMWF for SMOS activities.</td>
<td>AI-10</td>
<td>JMS</td>
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<tr>
<td>[57]</td>
<td>SM: SMOS extension for EOEP5. Having SMOS DA operational at ECMWF would</td>
<td>C</td>
<td>SM</td>
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<td>[58]</td>
<td>We cannot commit for operational implantation of SMOS DA. However if the impact is neutral or positive operational implementation will be supported by ECMWF core staff. PdR: an option would be to consider and evaluate DA in the southern hemisphere. Based on JMS preliminary results the best impact is obtain in the SH.</td>
<td>B</td>
<td>PdR, LI, JMS</td>
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<tr>
<td>[59]</td>
<td>June 2015 will be a break point for ECMWF to indicate if a possible operational implementation is foreseen.</td>
<td>C</td>
<td>MD, SM</td>
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<td>[60]</td>
<td>MD proposes to include a soft statement to indicate that ECMWF will support core activity to implement operational implementation, if results are promising enough. LI agrees.</td>
<td>C</td>
<td>MD, LI</td>
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<td>[61]</td>
<td>End of teleconf with SM and YK</td>
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<td>[62]</td>
<td>MD would like to have more frequent meetings than currently (~once per year). Having informal scientific meetings would allow more scientific interactions. It would also allow Joaquin to have less work to prepare progress meetings. Agreed.</td>
<td>B</td>
<td>MD</td>
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<td>[63]</td>
<td>MD: for CCN4 D2 and D5 ECMWF proposes to have scientific reports instead of ‘submitted paper’ requested in the SoW (in addition to the technical reports of D1 and D4). LI says that we don’t want to commit to submit a paper because we are not sure that the results will be worth publishing. MD agrees to keep D2 and D5 as scientific report</td>
<td>B</td>
<td>MD, LI</td>
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<td>[64]</td>
<td>These meeting minutes should be short and they should list the actions and decisions.</td>
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<td>[65]</td>
<td>The meeting was ended after declared completed, by MD</td>
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<td>MD</td>
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<td>Action Item</td>
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<td>Due Date</td>
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<td>AI-01</td>
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<td>MD</td>
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<td>JMS</td>
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<td>AI-02</td>
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<td>AI-05</td>
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<td>AI-06</td>
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<td>AI-07</td>
<td>SM, PdR</td>
<td>Q4 2014</td>
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<td>AI-08</td>
<td>JMS, NR, PdR</td>
<td>October</td>
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<td>YK, MD, JMS</td>
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Annex 2: CCN proposed schedule

Note that it will be numbered CCN4 (decision item #45)

SMOS DA study Phase II, CCN3 schedule

2014
2015
2016

Sep  Nov  Jan  Mar  May  Jul  Sep  Nov  Jan

ECMWF | CESBIO | ECMWF
WP 4020: NRT chain

WP 4040: SMOS ASCAT

WP 4010: VS Study

4060: SMOS wind DA

ECMWF | CESBIO | ECMWF
WP 4030

ECMWF (JMS) 4PM & CESBIO (2PM)

ECMWF (JMS)

VS in DA Section (CESBIO / LERMA)

ECMWF DA & Sat sections (JMS)

ECMWF Marine Aspect Section

4650: SMOS Sea Ice