

# KASC Data Analysis Procedure and Scientific Publication Strategy and Policy

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KAI Steering Committee and KASOC

- July 4, 2008 -

The present document is intended to provide guidelines for the KASC Data Analysis Procedure as well as the Scientific Publication Strategy and Policy. The KASC Data Analysis Procedure is linked to the target selection procedure described in detail in DASC/KASOC/0006 (Number of targets and target selection for Kepler Asteroseismology). The KASC Scientific Publications Strategy and Policy ensures that publications are accurate, that credit is fair to the authors and other contributors, and that the data and the science results should be provided to the scientific community and the public in a timely fashion.

A result of the target selection procedure is a set of Target Proposals that are being submitted by individuals and research groups within KASC. Although a person or a group proposes targets to go on the Kepler seismology program it is important to note that individual KASC members cannot insist on the selection of a given targets and no targets will be "owned" by any member of KASC. All target selection is based on optimization of science return and is a process that is regulated by the "Letter of Direction", signed by William J. Borucki, Ronald L. Gilliland and Jørgen Christensen-Dalsgaard. In the "Letter of Direction" it is stated that the purpose of the Kepler Asteroseismic Investigation is to ensure that full use is made of this potential to benefit the Kepler investigations of extra-solar planetary systems.

The target selection for each of the Kepler target slots (long or short cadence) in relation to the asteroseismic programme will be done by the KAI Steering Committee based on recommendations by the KASC Steering Committee and the KASC Target Proposals and discussions at, and input from, the KASC workshops.

Members of the two relevant Steering Committees are:

## **KASC Steering Committee:**

1. Jørgen Christensen-Dalsgaard – chair (KASOC, University of Aarhus)
2. Ron Gilliland (STScI)
3. Tim M. Brown (LCO)
4. Hans Kjeldsen – KASOC Project Scientist (KASOC, University of Aarhus)
5. Bill Chaplin (School of Physics and Astronomy University of Birmingham)
6. Travis Metcalfe (High Altitude Observatory, NCAR, Boulder)
7. Mario Monteiro (Centro de Astrofísica de Universidade do Porto)
8. Thierry Appourchaux (IAS Orsay)
9. Steven Kawaler (Department of Physics and Astronomy, Iowa State University)
10. Conny Aerts (Instituut voor Sterrenkunde)
11. Claude Catala (Observatoire de Paris )
12. Don W. Kurtz (Centre for Astrophysics, University of Central Lancashire)

## KAI Steering Committee:

1. Ron Gilliland – chair (Kepler Co-I, STScI)
2. Jørgen Christensen-Dalsgaard (Kepler Co-I, KASOC, University of Aarhus)
3. Tim M. Brown (Kepler Co-I, LCO)
4. Hans Kjeldsen – KASOC Project Scientist (KASC, University of Aarhus)

## KASC Data Products

The Kepler Asteroseismic Science Operations Centre (KASOC) at Danish AsteroSeismology Centre (DASC) at the University of Aarhus in Denmark will produce a series of data products that will be available for KASC.

Those data products are:

- SOC calibrated photometry (after transit removal filtering)
- Extracted frequencies, amplitudes and phases
- Line widths, rotational splitting, mode identification and noise background
- Characteristic frequency separations for solar-like stars (small and large separation and peak power)
- Basic stellar parameters (for solar like stars) such as density, mass, radius, Helium abundance in the core, age, inclination (of rotational axis), rotation period (all with error bars)

Via the open KASOC pipe-line all those data products will be made available to KASC for all the stars selected by the KASC.

## KASC Data Analysis Procedures

According to the target selection procedure the first targets are selected by the KAI Steering Committee in mid October 2008. The first list will be uploaded from KASOC to Science Office mid November 2008 and those lists will at the same time be released to the Kepler Asteroseismic Science Consortium. When the lists are uploaded to the Kepler Science Office the content of each Target Proposal will be made available to KASC (except the detailed science justification that we intend to remove before releasing the proposals to KASC).

After defining the target lists detailed planning of the data analysis procedure, collaborations and the publication process will be started. In order to organize this work we need to know the intent of all members of KASC. While data for all observed stars will be available for all KASC members to use and all members of KASC may work any of the KASC data we want individual KASC members to declare their intent such that the two Steering Committees will be able to plan the data analysis and publication procedure. Data will be available from the KASC webpage which will be password protected and each KASC member will have their own private password. All download will be logged such that KAI will have a clear idea about the data distribution. Any KASC member will have the right to download any time series that can be downloaded from the KASC webpage.

### Letter of intent:

We will ask all members of KASC to submit one or more letters of intent describing their interest in the KASC data and describing the intentions for data analysis. There will be a template for submission of letters of intent and only KASC members that have submitted a letter of intent will be given a password for the KASC webpage. The KASC Steering Committee will define a series of KASC main areas and any KASC member that wishes to work in one or more of those areas will need to submit a letter of intent in relation to each of those main areas. The call for letters of intent will be released on **15 November 2008** and the deadline for submission of letters of intent will be **15 December 2008**.

### KASC working groups:

Based on the letters of intent the KASC Steering Committee will appoint members of the working groups connected to analysis of the different targets (divided according to different sub disciplines). The aims of those groups are:

- (1) Ensure coordination of the KASC work in relation to data analysis. All KASC members are supposed to collaborate on analyzing and modeling the seismic data and a given KASC member is expected to take active part in the working group activities.
- (2) Ensure a fast and coherent publication procedure for the primary papers. It is the intention that each working group will publish a few key papers related to the data within that given group and those papers will present the general results of the Kepler asteroseismology.

All letters of intent and the list of members in each working group will become public within the KASC on **1 February 2009** after which the working group may start their work by defining the tasks and divide the preparation work.

It is the idea that each working group will have a chair that has been selected and appointed by the KASC Steering Committee and the chair will be responsible for organizing the work in relation to analysis of the data that are related to the given working group. Responsibility within the working groups for organizing work will extend through publication of the primary results. After this the groups can continue to collaborate, but individual KASC members can then continue independent work and publish individual papers within the boundaries of the publication policy (e.g. concerning authorship and approval by the KAI Steering committee). The KASC Steering committee may setup working groups throughout the mission in order to secure the data analysis and publication quality.

The first data will be released to KASC on 30 September 2009 and the first papers should be ready for publication around 1 February 2010. Publishing data from the Kepler data will be one of the main tasks for each of the KASC working groups.

## Data Release, Scientific Publication Strategy and Policy

Members of KASC will have access to data for all stars that are selected by the KASC, approved by the KAI Steering Committee and observed by the Kepler Satellite, as soon as the data are made available in the KASOC. Such data are reserved for KASC members in a proprietary period in accordance with the general project rules, extending approximately for one year after the data have been received from the spacecraft.

Data for stars that are selected as planet hosting candidates will not be distributed outside KASOC. Those data will only be analyzed by the internal KASOC pipeline, up to and including the determination of basic stellar parameters (radius and evolutionary state).

KASC members work under a data policy defined to be consistent with the general policy for the Kepler mission, as overseen by the Kepler Science Council (KSC). If a person cannot accept the policy or fails to comply with it, the KAI Steering committee can take action to cancel the KASC membership for that person.

The data policy / data publication guidelines are:

1. All KASC members have unrestricted access to all data on KASC-selected targets in KASOC. Access is password controlled and data downloads are logged.
2. All members that contribute to a given data set (analysis, target selection, ground-based follow-up etc.) shall be on publications related to that given data set. Each KASC member will be asked to submit a letter of intent describing the interest of the KASC member in relation to data analysis.
3. Members are supposed to collaborate and a number of working groups (based on the letter of intent) will be set up to ensure analysis of time series data for specific targets.
4. KASC members that work on data related to a specific target (and have expressed an interest by submitting a letter of intent) are asked to join a possible subgroup that may be responsible for that target.
5. Any publication that will be submitted shall be checked and formally approved by the KAI Steering committee before submission. The KAI Steering Committee has the right to modify the list of authors to make it conform with the data-policy guidelines. Prior notification to the KAI Steering Committee is also expected for press releases, conference presentation, general talks, etc.
6. The KAI Steering Committee will keep the PI/KSC informed of requests for publication and presentation reviews. Early and/or mission-comprehensive papers in asteroseismology will be required to have broader authorship reflecting general contributions of the Kepler Science Team in accordance with NASA policy. Details will follow below.
7. Any paper ready for submission for publication will be uploaded to the KASOC webpage where all KASC and Kepler Science Team members will be able to review and read the paper. This will allow a transparent process of publication and will give individual KASC members a chance to comment on or submit request for changes before publication.

### All KASC members will have signed a Non-disclosure agreement:

The undersigned member of the Kepler Asteroseismic Science Consortium (KASC) recognizes that the data made available in the Kepler Asteroseismic Science Operations Centre (KASOC) are intended solely for the use for asteroseismology and that the data have been processed in such a way that all information about planetary transits should have been removed. Should indications suggesting the presence of a transit nonetheless emerge during analysis of the data, with this agreement I undertake not to reveal this information in any form, orally or in writing to anybody, with the exception of Kepler Col Ron Gilliland (gillil@stsci.edu) ; Gilliland will then discuss the result with the Kepler PI who will decide on further action.

### Type of Publications and authorship

It is in the interest of KASC as a whole as well as for individual research scientists within KASC that the publications are accurate, that credit is fair to the authors and other contributors and that the data and the science results should be provided to the scientific community and the public in a timely fashion.

Some publications will involve intensive focused studies on particular stars based on complementary data and previously announced planet detection. The publications which result from these studies may have only a few authors who were directly involved in the specific research. In contrast, there will be several papers that present the main results of the asteroseismic part of the mission. Many people involved in KASC and in the *Kepler* mission will be included in the author lists, even if they were not directly involved in reducing/analyzing the data or writing the results up. It is expected and assumed that the first and major papers will be general papers with many authors and that the more specific papers will be published later in the mission. However, general papers may be published throughout the mission. The KASC Steering Committee will appoint a person responsible for coordinating the work in relation to each of the general papers (this will often be a chair of a KASC working group). The following set of guidelines needs to be followed when authorship is decided for a given paper. Any dispute will be decided by the KAI Steering Committee (in consultation with the KSC).

1. The primary author (the person that is doing the major part of the work) of each KASC publication shall be listed first in the authorship list. This is not necessarily a chair of the KASC working group or a person who initiates the writing or organizes the writing.
2. Any KASC member who writes or contributes substantially to any part of the publication shall be included in the authorship list, if that person so chooses. A KASC member that has submitted a letter of intent is allowed to work on a given KASC data set and will as a result be included in the authorship list provided that the person contributes significantly to the work.
3. Everyone who is listed as an author of a given paper is expected to read a draft version of that paper, and inform in a timely manner the first author of agreement with the paper and of any suggestions for improvement.
4. The major papers resulting from the KAI activities and defined by the KASC Steering Committee will need authors from the Kepler team in general. The PI and KSC (Kepler Science Council) will be consulted in respect to this as soon as papers are ready for publication. Given the various levels of involvement, authorship on these papers will be given as follows:
  - The PI, deputy PI and KAI Steering Committee members may be co-authors on all such publications, although not necessarily as lead author.
  - Members of the KASC typically will be authors on a number of such papers (will be related to their letter of intent).
  - As stated above the primary author shall be listed first in the authorship list. Second or/and third authors on the major papers may be Kepler Science Team members that have contributed significantly to constructing the Kepler satellite and the Kepler data analysis. The PI will be consulted in relation to the author list.
5. The authorship of specialized papers describing specific aspects or providing in-depth asteroseismic analysis shall be by those leading the effort. The PI and Deputy PI have the option of being included as co-authors whenever such papers use data not yet available to the public.
6. All authors are supposed to read and approve the final version of the publication before it is uploaded to the KASOC webserver for general reviewing.