SISCAL
Satellite-based
Information System
on Coastal Areas and Lakes

User Handbook

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1 Introduction

This User Handbook describes how to use the SISCAL service for ordering and downloading SISCAL data products. Ordering data products in SISCAL is done through the SISCAL user interface accessible through http://www.siscal.net by the following four steps:

1. Registering as a SISCAL user;
2. Setting up user-specific profile(s);
3. Ordering data products for the pre-defined profiles;
4. Downloading the finalized data products.

The following sections describe these four steps in more detail and provide additional information on the SISCAL service and data products.

The SISCAL website is divided into a public area providing general information on the SISCAL service and a restricted area to which only registered users are granted access. Through registration, users get full access to the SISCAL service. Here, we distinguish between two modes of user interaction:

- The demonstration mode gives access to a subset of the available instruments (AVHRR and MODIS) and algorithms (RGB images and sea surface temperature). In addition, the use of the SISCAL service is limited to a specific number of jobs (actually 100, figure subject to change according to server load). The demonstration mode is free-of-charge.
- The operational mode gives access all available instruments and algorithms for an unlimited number of jobs. Customers can provide their own algorithms which will then be implemented into the system (and will by default be invisible to other users). The operational use of SISCAL is not free and requires a contractual agreement between the customer and the SISCAL operators as well as eventually between the customers and the EO data provider (the customers needs e.g. to be an authorized SeaWiFS user to get access to SeaWiFS data).

2 The SISCAL public area

The SISCAL public area gives a short and concise overview about the SISCAL system. It introduces into the concept of SISCAL, lists its functionality and presents sample products from the standard processing chains. The following subsections show screenshots of the SISCAL public pages. Please go to the corresponding URLs to see the actual versions of these pages.

The lay-out of all SISCAL pages is identical:

- On the top left, registered users can log-on into the restricted area. Alternatively, new users can access the registration procedure
- Below, the menu "*Resources*" gives access to publicly available information. These pages are shown and described in more detail below.
- The individual contents of a page are shown in the large frame on the right.

When calling the SISCAL service under http://www.siscal.net, the first page offered is the "*Welcome*" page. This page shortly introduces the SISCAL service and lists recent messages of interest to the SISCAL users.

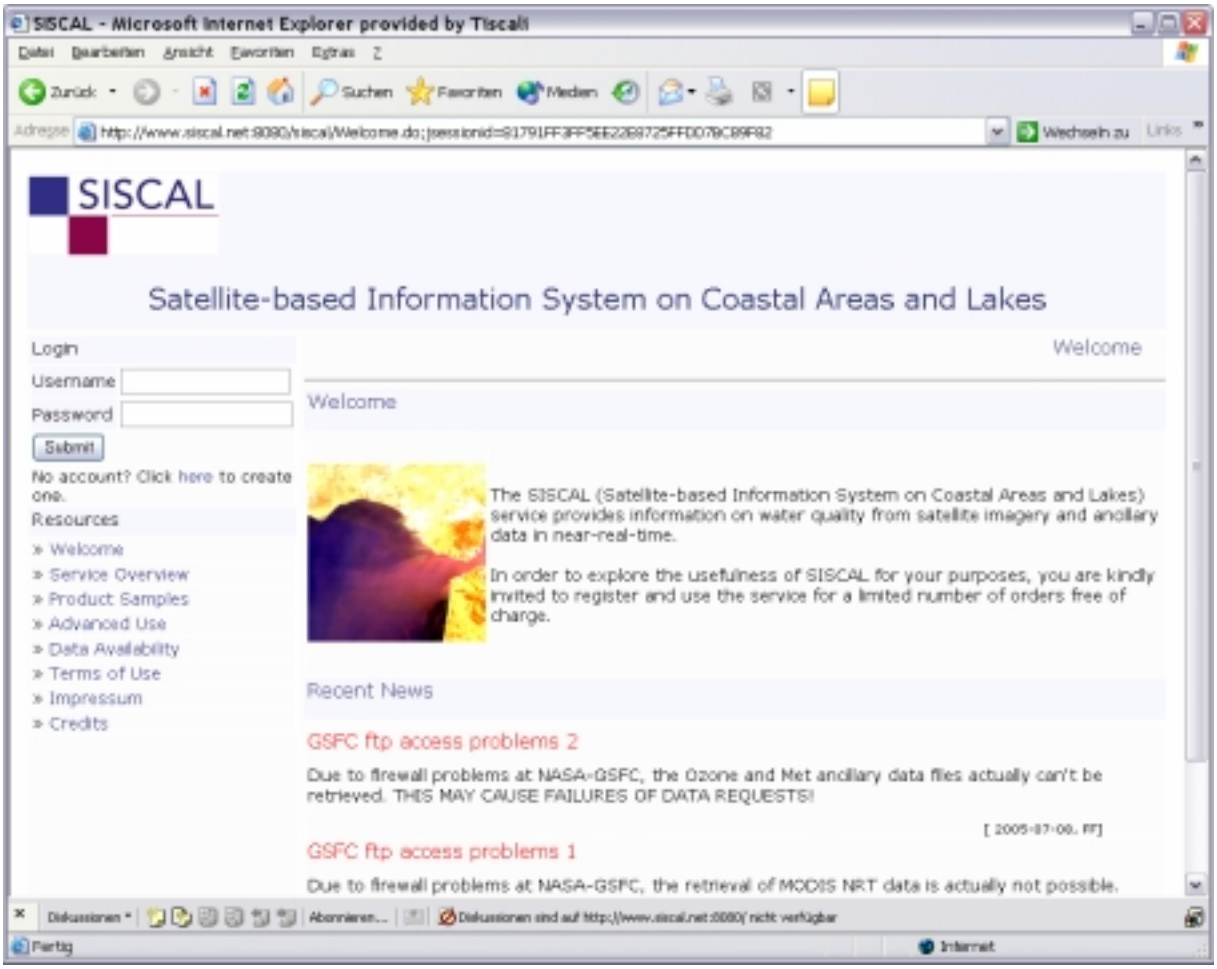

Figure 1: SISCAL Welcome page, http://www.siscal.net:8080/siscal/Welcome.do.

2.1 Service overview

The service overview page lists the main functionality of SISCAL. In case more specific information is needed, please contact the operators of SISCAL under siscal@informus.de.

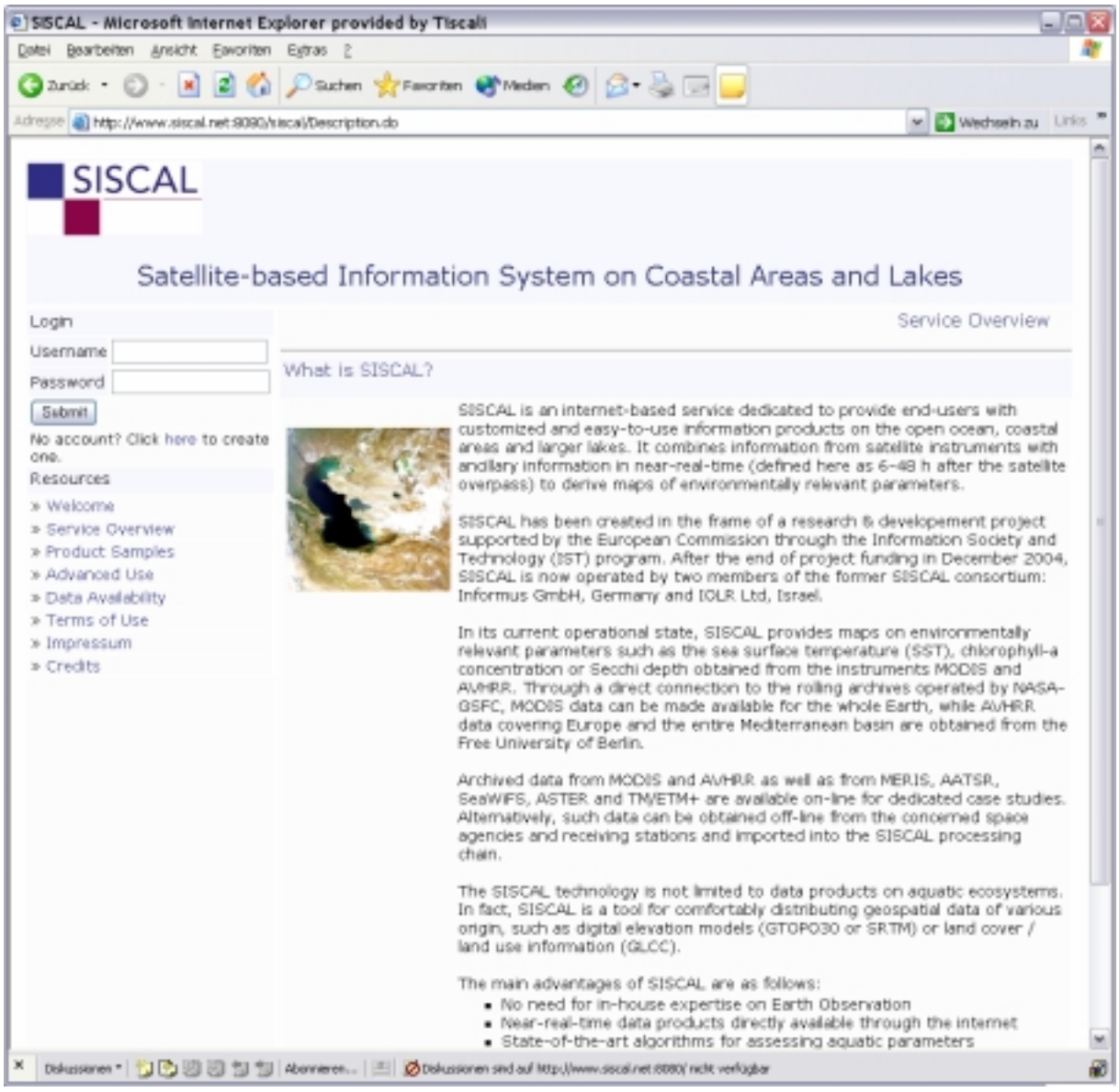

Figure 2: http://www.siscal.net:8080/siscal/Description.do, SISCAL service overview.

2.2 Product samples

The “Product Samples” page is a showcase of SISCAL data products representative of different sensors, algorithms, areas of interest, etc. Clicking on the thumbnail images to the left opens the corresponding standard SISCAL image product.

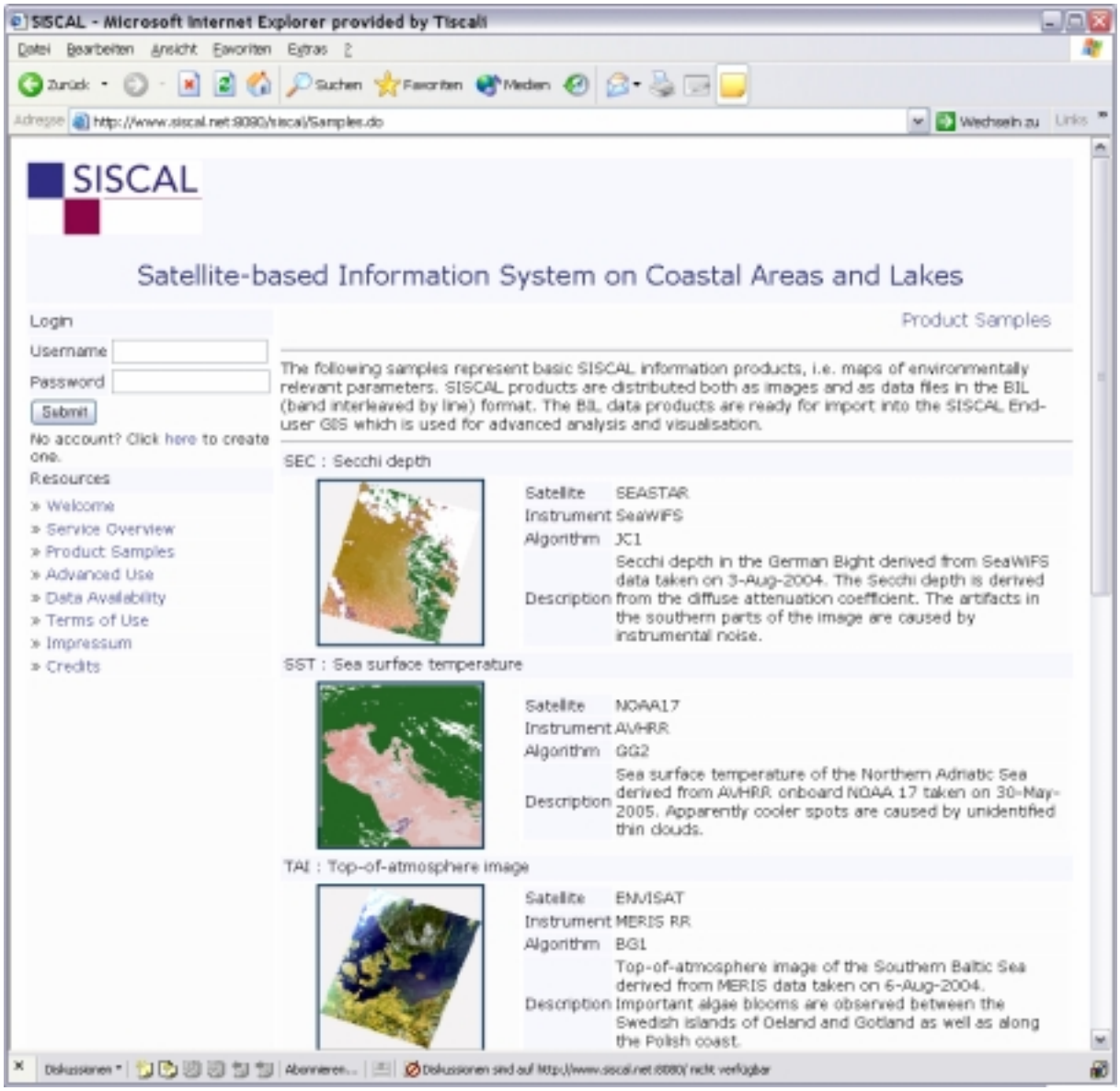

Figure 3: Samples of SISCAL standard products http://www.siscal.net:8080/siscal/Samples.do,

2.3 Advanced usage

A specific GIS solution has been developed for SISCAL products. This so-called SISCAL end-user GIS is based on ArcGIS 8.x and the Spatial Analyst extension (ESRI). The end-user GIS offers the standard ArcGIS 8.x functionality plus a SISCAL-specific toolbox. Please contact us under siscal@informus.de in case you need further information on the functionality and availability of the SISCAL end-user GIS.

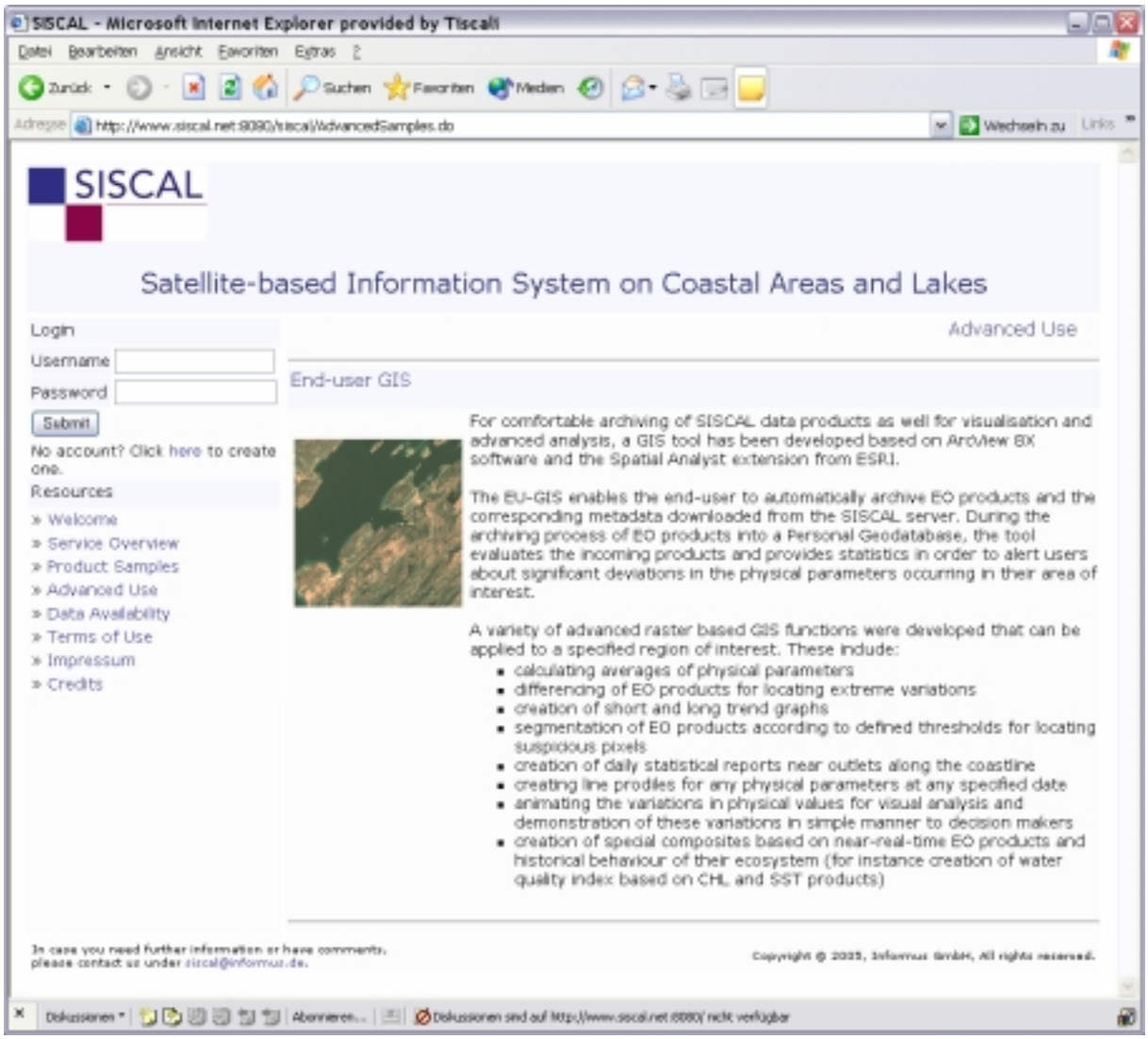

Figure 4: Description of advanced products based on SISCAL standard products and the End-user GIS, http://www.siscal.net:8080/siscal/AdvancedSamples.do.

2.4 Data availability

One of the most important issues of SISCAL is data availability. In general, data availability is good for AVHRR (Europe) and MODIS (global). The public area of SISCAL lists the combinations of instruments, areas and time spans (termed here "*Acquisition phase*") for which data can be made available, either:

- Online, i.e. direct access to the data and consequently rapid product generation, or
- Offline, i.e. through ordering of the raw data from the respective data provider, which may take between days and weeks, depending on the instrument.

The available data sets (satellite overpass times) are precisely specified when ordering data products. The comment line indicates which acquisition phases are available for the demonstration mode (DEMO) and for the operational mode (OP).

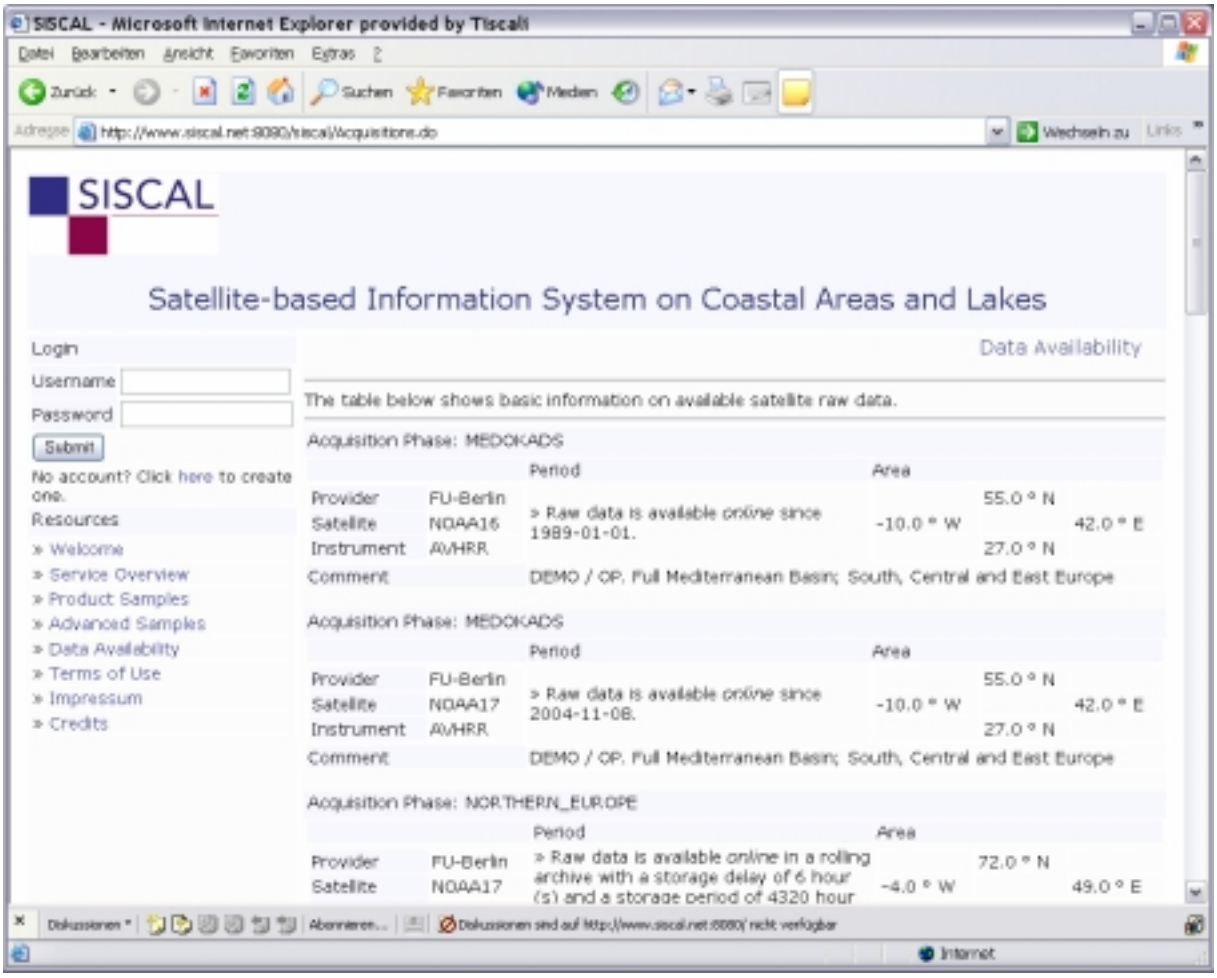

Figure 5: Available acquisition phases of the SISCAL service, http://www.siscal.net:8080/siscal/Acquisitions.do.

2.5 Terms of use

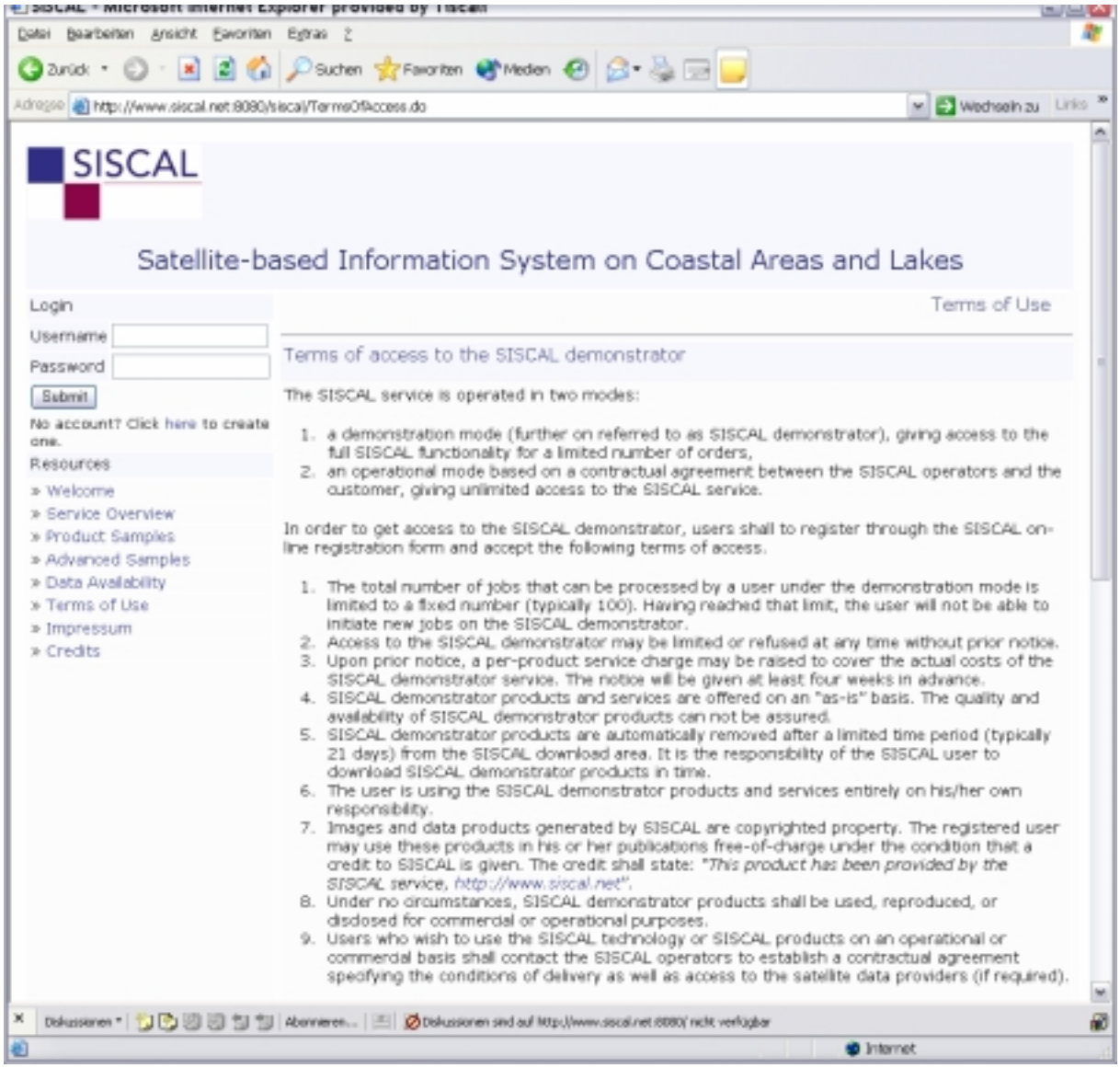

Figure 6: Terms of access for using the SISCAL service, http://www.siscal.net:8080/siscal/TermsOfAccess.do.

2.6 Credits

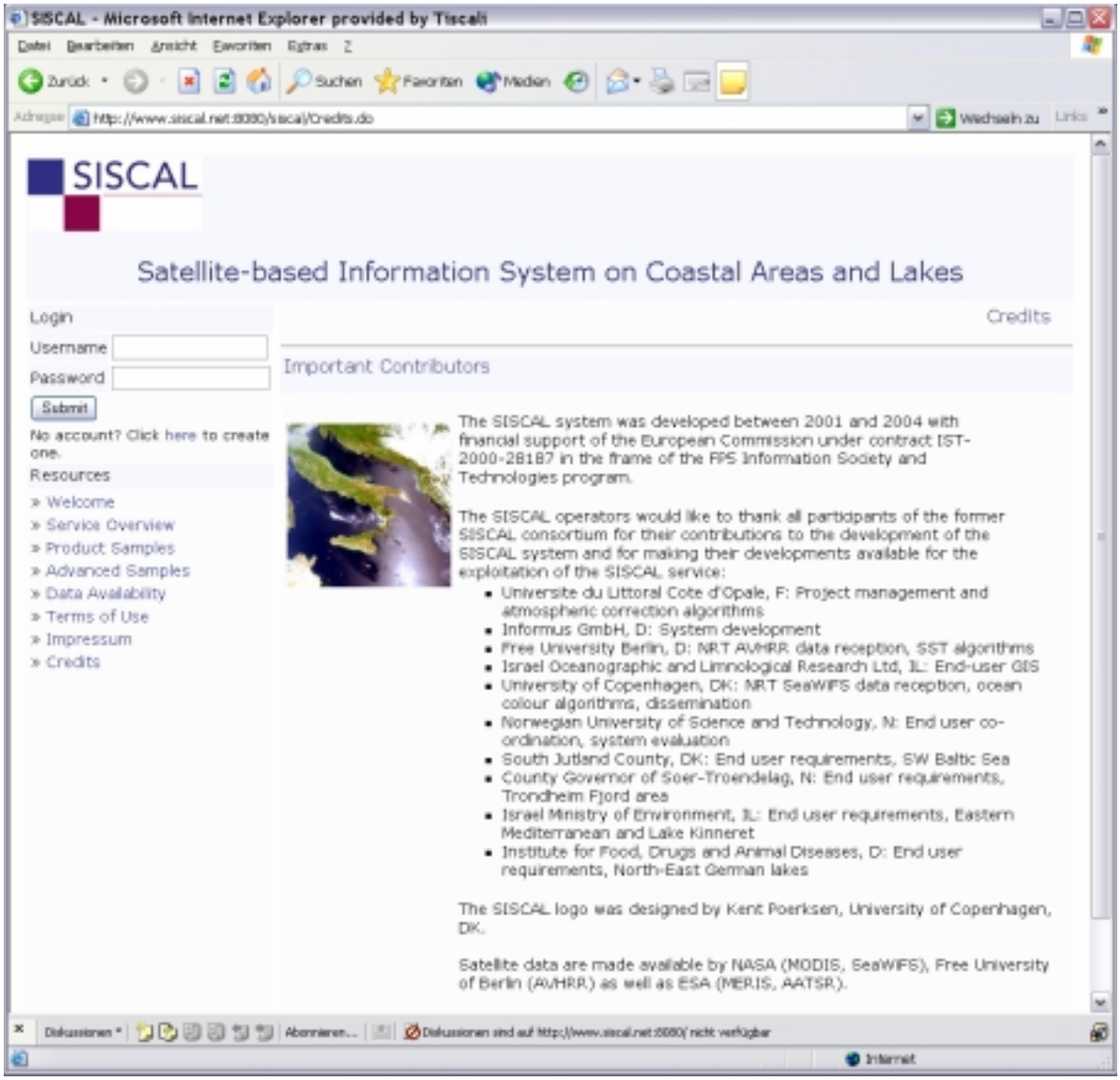

Figure 7: People and institutions who have contributed to SISCAL from its very early stages, http://www.siscal.net:8080/siscal/Credits.do.

3 The SISCAL restricted area

The SISCAL restricted area is available to registered users. It allows ordering and retrieving SISCAL data products.

The following steps are required to order SISCAL data products:

1. registration to the SISCAL service (see section 3.1):
    a. By default, a new user is given access to the SISCAL demonstration mode with limited access to instruments and algorithms;
    b. Should a registered user require access to instruments (e.g. SeaWiFS, MERIS) or algorithms (e.g. Chl-a, Secchi depth, …) that are not part of the demonstration mode, his/her account will be individually modified according to his needs. Please contact us under siscal@informus.de in this case;
2. defining “Profiles” (see section 3.2): A profile defines a suite of products to be derived from one instrument, for one area of interest, using specific product generation algorithms and user-specific geographical projection and data formatting;
3. ordering products (see section 3.3): The order process encompasses just three steps, since most required information has already been specified during profile definition;
4. retrieving products: On completion of a request, the user is notified by e-mail on the availability of data products (see section 3.4). By clicking on the link specified in the e-mail, the user is directly forwarded to the data products download area.

3.1 User registration

A new user has to register first in order to get access to the restricted area of the SISCAL service. Upon registration, a user is granted a package of typically 100 (figure subject to change according to server load) SISCAL jobs to be treated free-of-charge, where a job is defined as one treated satellite scene.

The registration procedure is accessed by clicking on the "*No account? Click here to create one*" link on the SISCAL public web pages (see arrow on Figure 8).

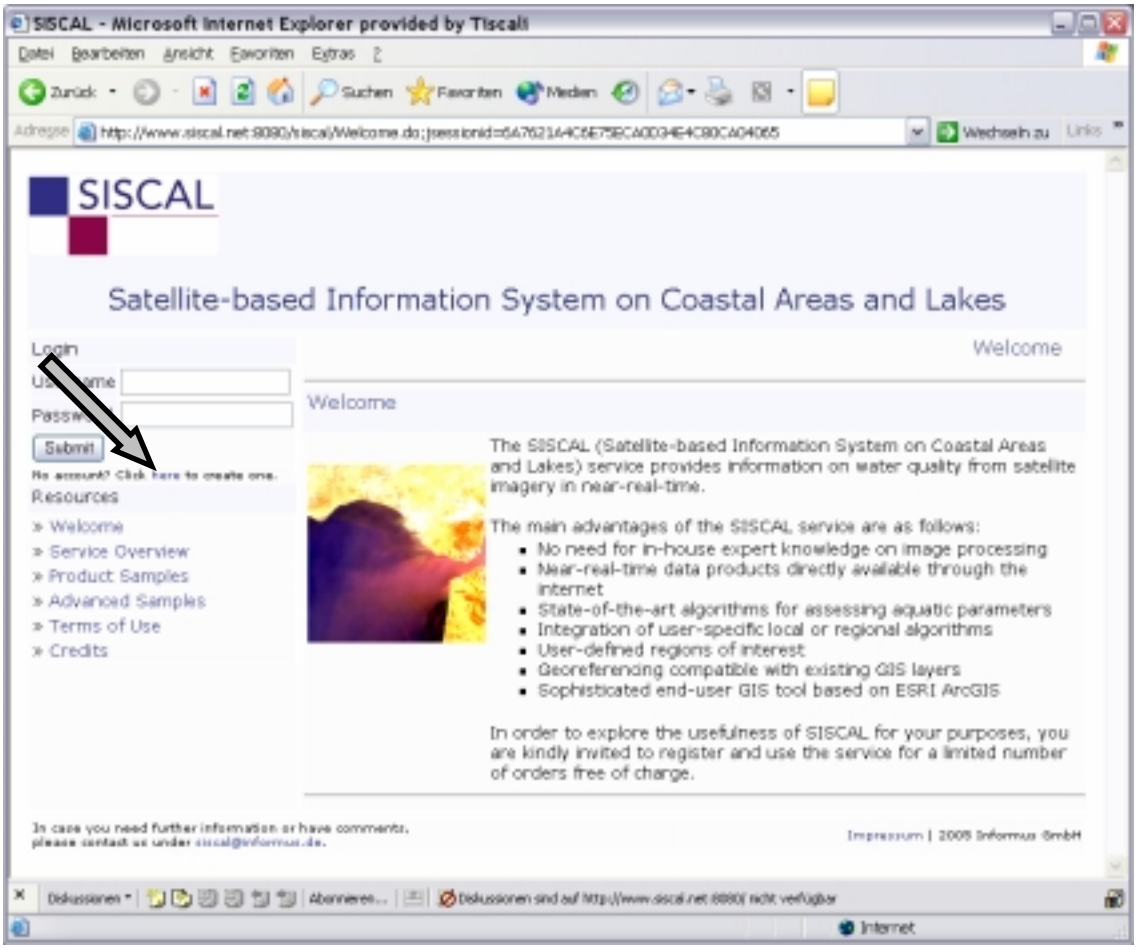

Figure 8: SISCAL welcome page. The arrow indicates the link to access the registration forms.

Registration is done in three steps:

1. enter your personal details (see Figure 9). The information with an asterisk is mandatory. In addition, you have to read and accept the SISCAL terms of use;
2. a registration key is sent to the e-mail address you have provided (see Figure 10). Clicking on the link given in the e-mail finishes the registration process. This way, we ensure that the indicated e-mail address is correct;

3. Successful registration is indicated both on the web site (see Figure 12) and by sending an e-mail to the specified e-mail address.

Note: By default, users are registered for using SISCAL in the demonstration mode. This gives access to a limited number of satellite instruments and algorithms. Access to the full range of SISCAL products needs to be based on a contractual agreement.

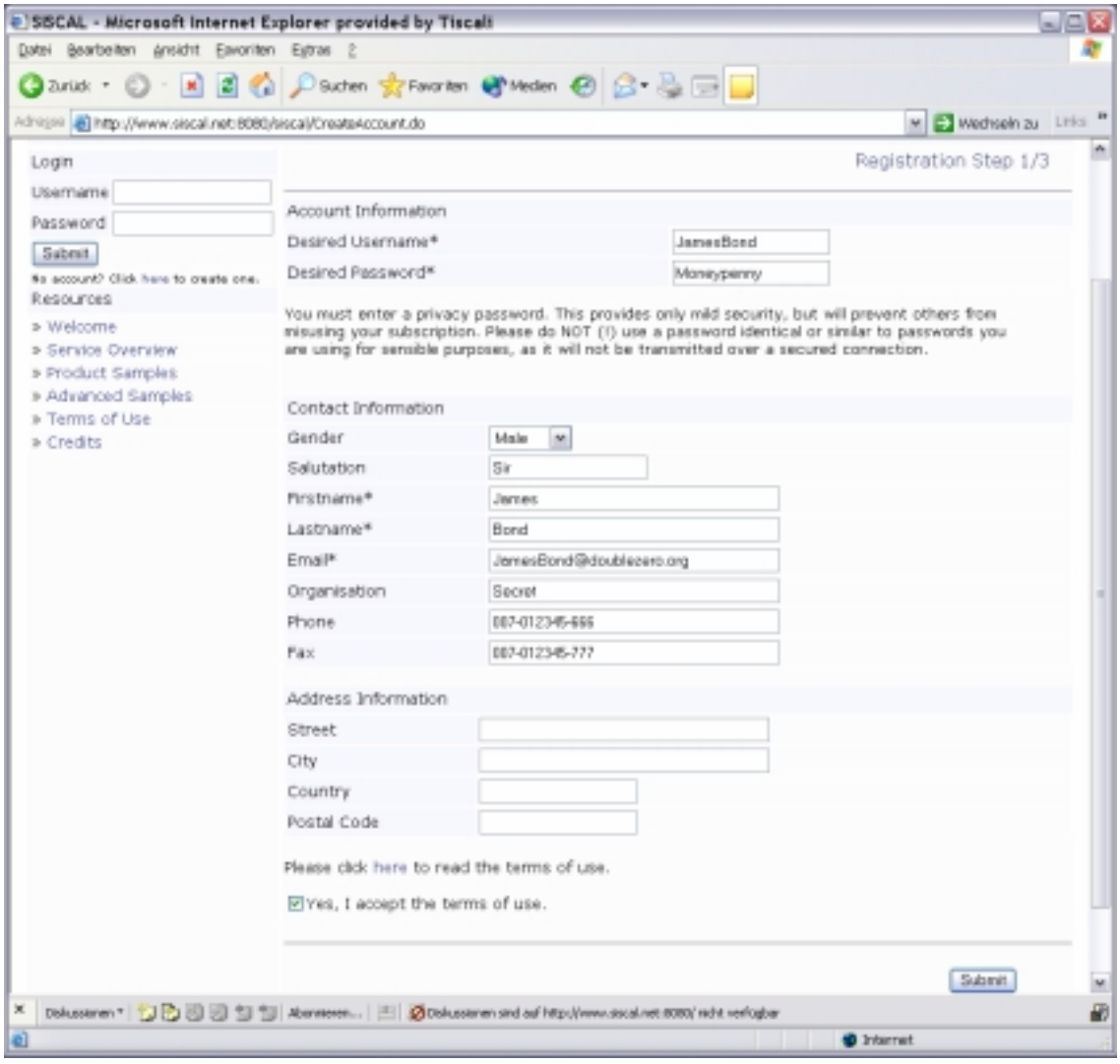

Figure 9: First step of SISCAL registration procedure. Information with an asterisk (*) is mandatory. We kindly ask you to also provide the other information for our user database.

Access to the SISCAL service is password protected to ensure the privacy of your SISCAL account and to prevent others from ordering products in your name. However, we actually have implemented only a limited level of security. We therefore recommend using SISCAL-specific passwords that do not resemble other passwords you're using.

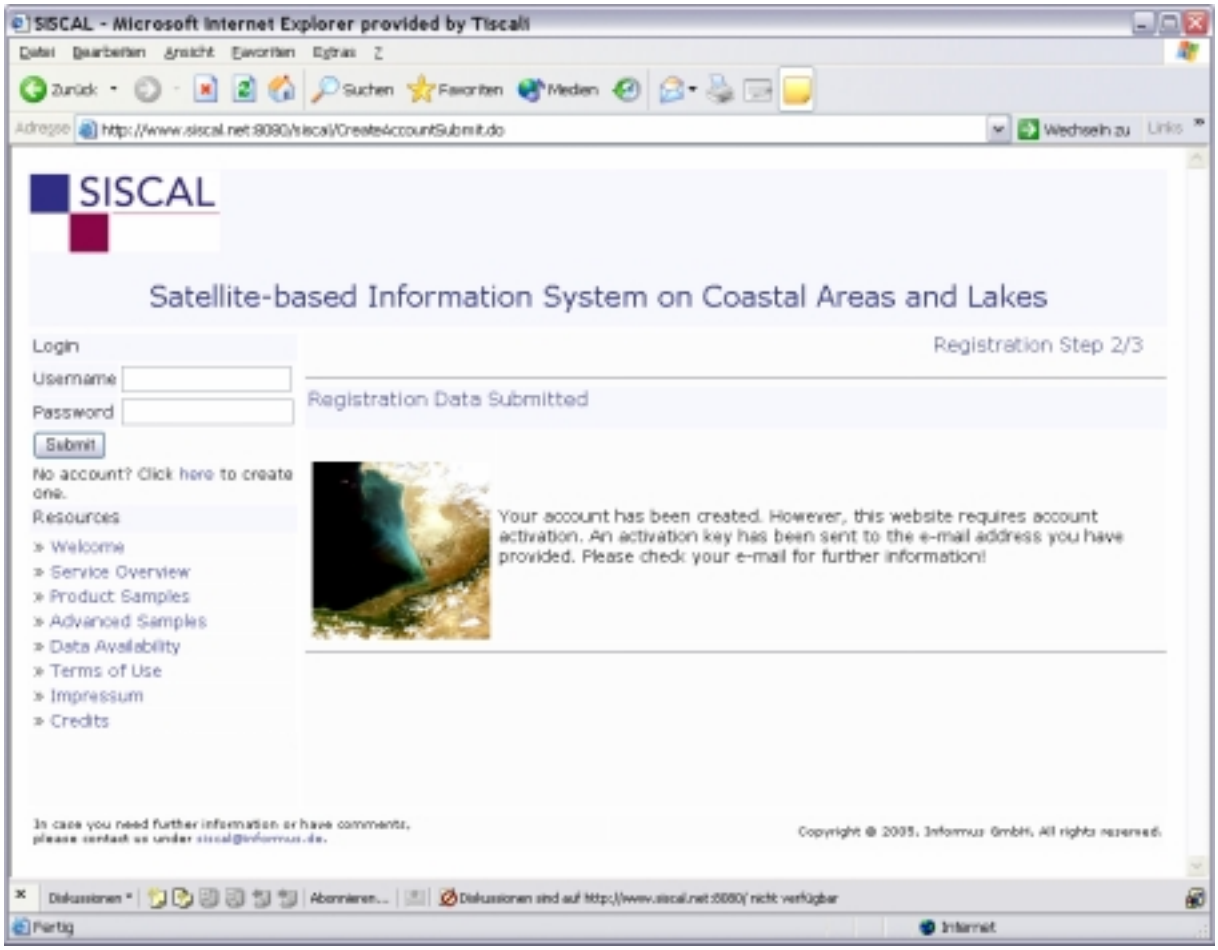

Figure 10: Confirmation of user registration provided on the SISCAL website.

```
Dear Sir James Bond,

thank you for your interest in SISCAL.
Your registration data have been stored.

Please click on the following link to register finally.

http://www.siscal.net:8080/siscal/SubscribeSubmit.do?key=6A3CABEF1C7BE7B8

If you're not satisfied with this and want us to delete
your details or simply have any comments or queries
about SISCAL, please do not hesitate to contact us.

---------------------------------------------------------------
NOTE: This email was generated automatically.
```

Figure 11: E-mail containing the SISCAL account activation key. Clicking on the link will finally activate the account.

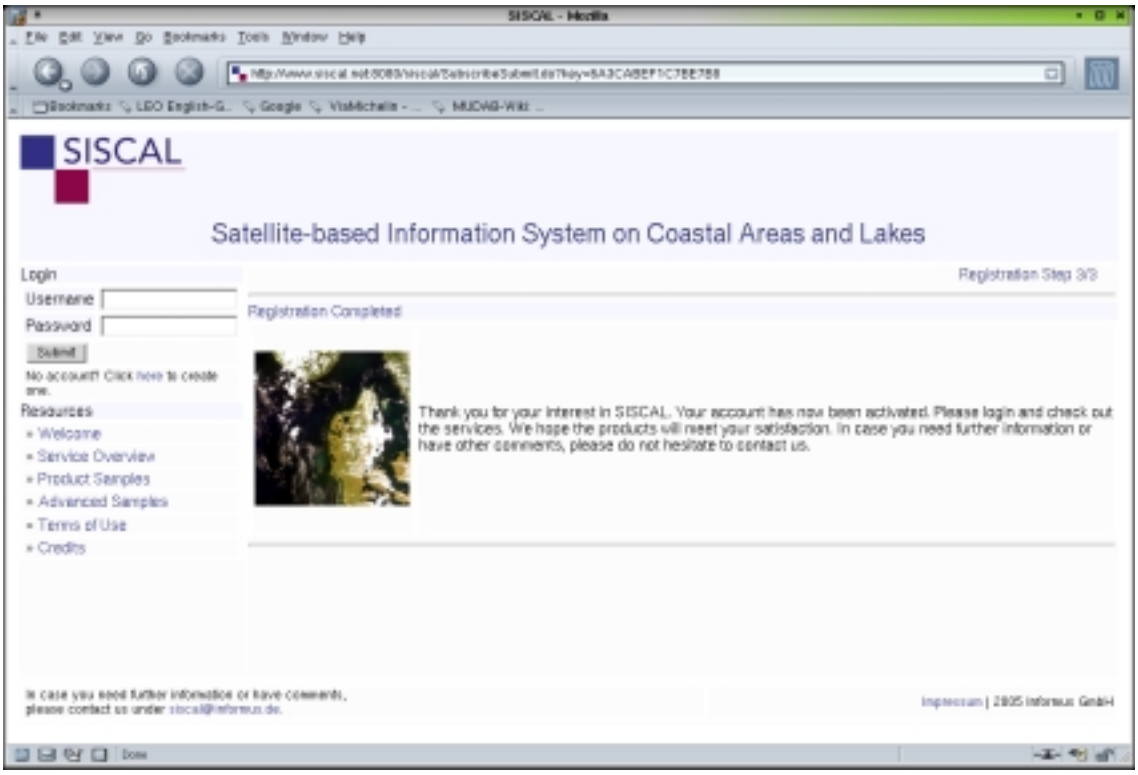

Figure 12: Confirmation of successful final registration. The account is now ready and the new user can directly log into the system by entering name and password in the log-in panel on the upper left.

3.2 Creating profiles

SISCAL data products are ordered for user-specific profiles. The rationale for this approach is that most users have specific requirements that will probably not change over time. Predefined user-specific profiles allow ordering data products with very little effort. In case of changing or new requirements on data products, the user simply adds another profile to his portfolio. In the actual state of SISCAL, profiles can only be established or deleted, but not modified. This is not a significant drawback, since creating a profile takes less than about two minutes.

A number of pre-defined profiles are automatically established during the user registration process.

By clicking on the “Manage Profiles” menu entry, the user arrives at the main window for user profile management. This window shows a list of all actually available profiles of the user. A limited number of default profiles are made available directly from the SISCAL system.

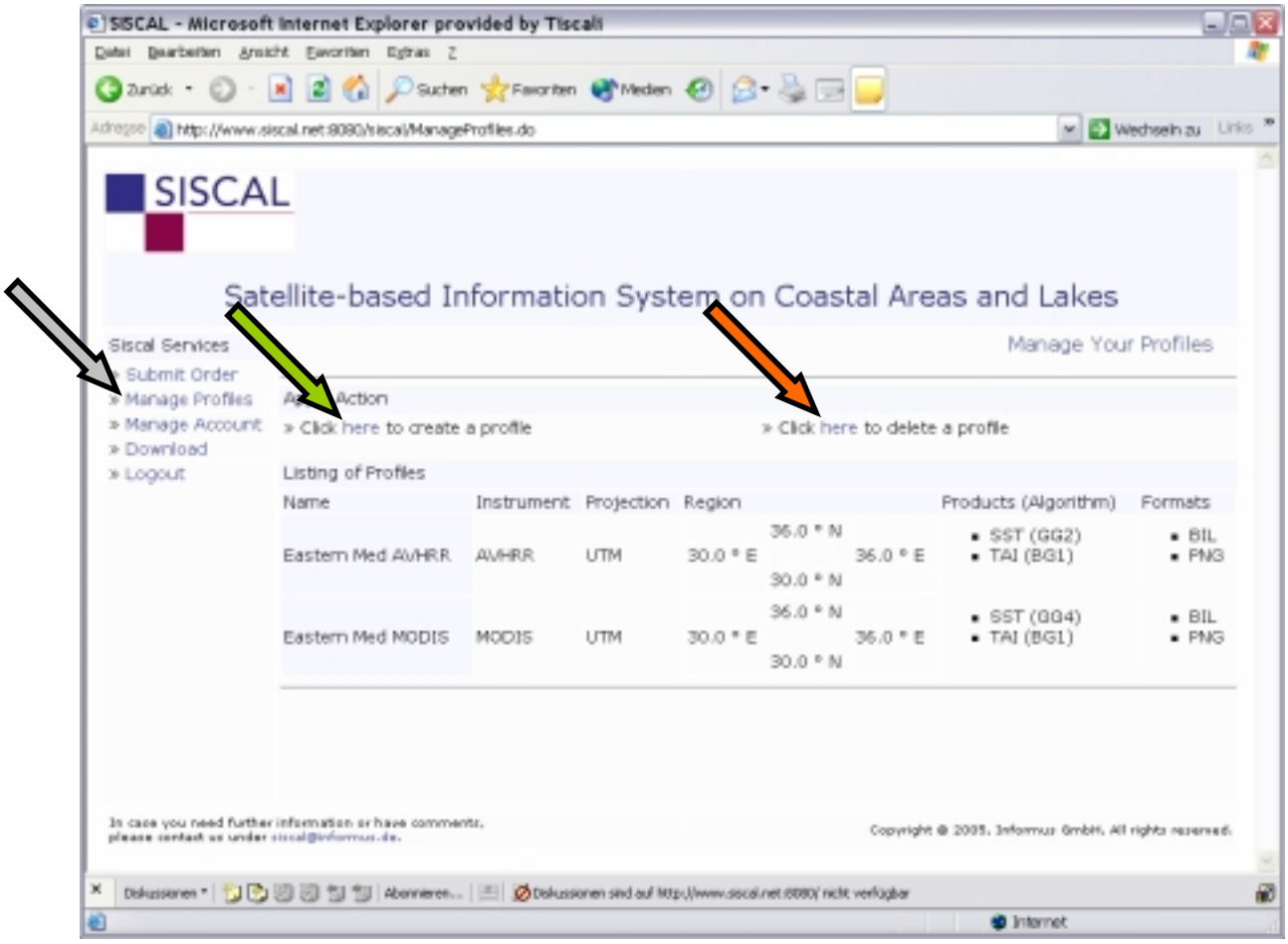

Figure 13: List of user-specific profiles accessed through the „*Manage Profiles*“ menu entry. After registration, a limited number of profiles are already available.

The dialogue for creating profiles is accessed by clicking on the “*Click here to create a profile*” and consists of seven steps as explained in the following subsections.

3.2.1 Step 1 of 7: Geographical area

In the first step of the creation of a profile, the extension of the area of interest has to be entered in geographic coordinates (latitude / longitude) in units of decimal degrees. Here, values east of the Greenwich meridian and north of the equator are to be specified as positive numbers. In addition, the profile should be given a unique, distinguishable name.

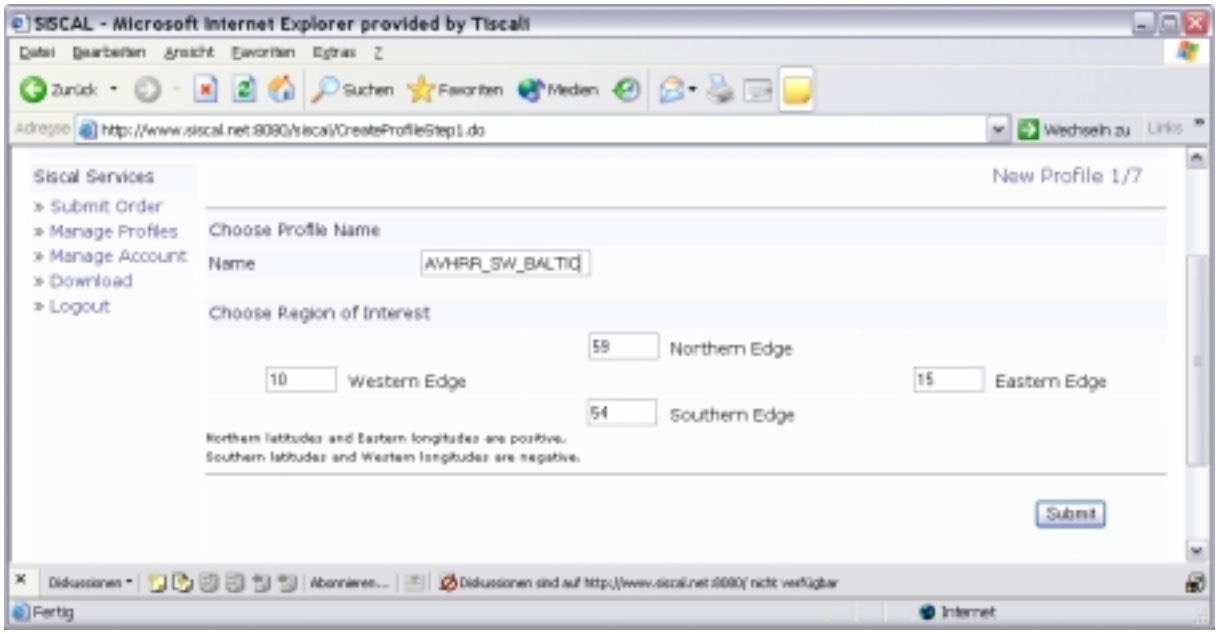

Figure 14: First step of profile creation - specification of the geographic area.

3.2.2 Step 2 of 7: Satellite instrument

In the second step of creating a profile, a satellite instrument has to be selected. Here, it is important to know the availability of satellite instrument data within the SISCAL service as well as the products that can be derived from the various instruments.

3.2.2.1 Data availability

Regarding data availability, it is distinguish between "*on-line*" and "*off-line*" availability.

- On-line data availability means that data is directly available from the SISCAL local archive or from external archives directly accessible through ftp.
- Off-line availability means that data have to be ordered from the respective satellite data provider. They are then either sent via storage media (such as DVD) or made available for a limited time span for retrieval via ftp. In order to be able to process such data, they have to be copied into the local SISCAL archive.

Only on-line data can be ordered directly through the SISCAL. Off-line data have to be ordered through the SISCAL staff who will make the data available on the SISCAL archive and initiate processing once this is done. Which data are actually available through SISCAL can be inquired through the "data availability" menu entry in the SISCAL public area (see

section 2.4). In the demonstration mode, access to satellite data is actually limited to AVHRR and MODIS data.

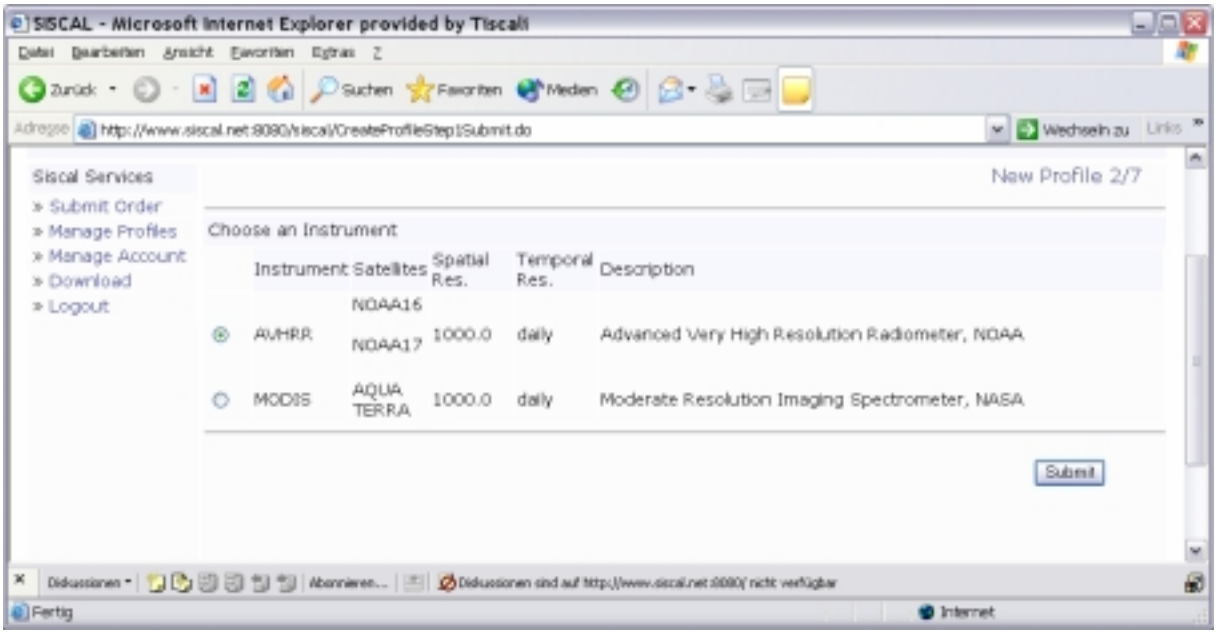

Figure 15: Second step of profile creation - specification of the satellite instrument.

3.2.3 Step 3 of 7: Product specification

In the third step of profile creation, the products have to be specified. All available products for the chosen instrument and the actual operation mode (demonstration mode by default) are listed. Selection is done by checking the box on the left.

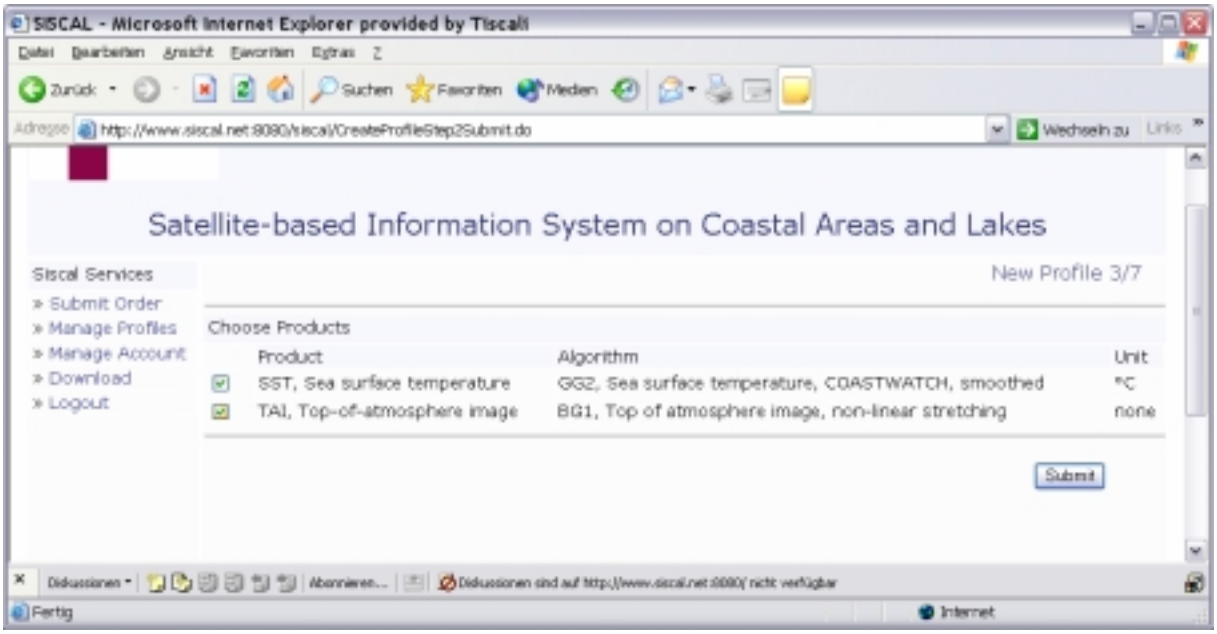

Figure 16: Third step of profile creation - specification of the products.

3.2.4 Step 4 of 7: Specification of geographical projection

In the fourth step of profile creation, the geographical projection needs to be specified. Actually, there are four geographical projections implemented:

- Geographic coordinates (latitude / longitude)
- Universal Transverse Mercator (UTM)
- Gauss-Krueger (German national grid)
- New Israel Grid

Further geographic projections can be made available on request.

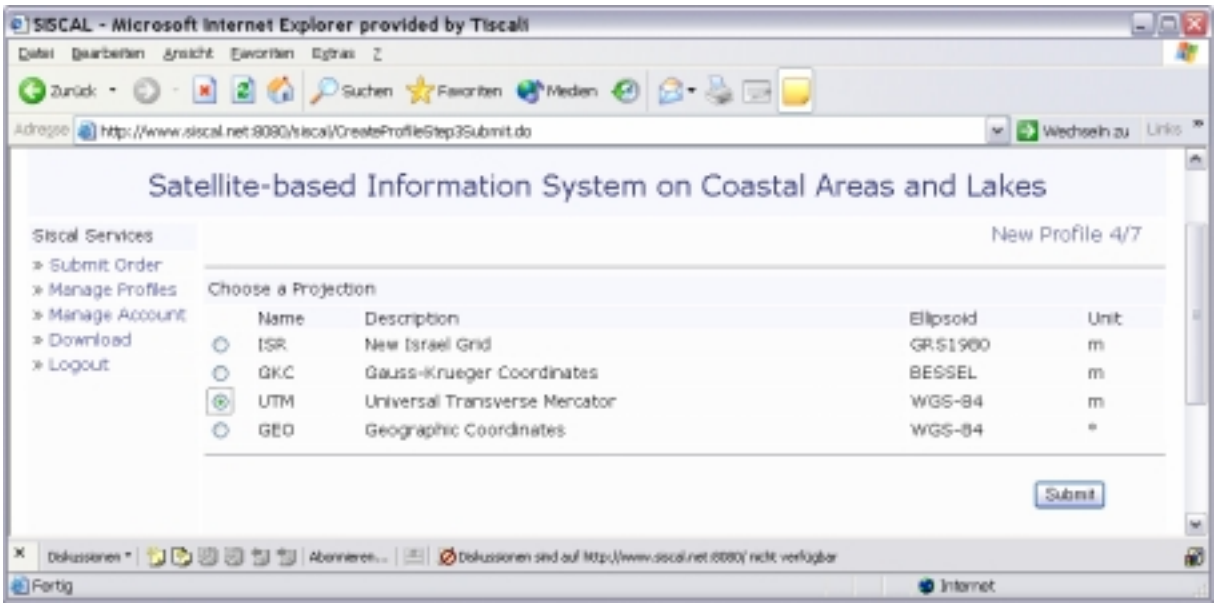

Figure 17: Fourth step of profile creation - specification of the geographical projection.

3.2.5 Step 5 of 7: output specifications

In the fifth step of profile creation, the output specifications need to be specified:

- Default values are proposed for the output resolution in x- and y-direction. These values may be altered according to the requirements of the user.
- The zone for UTM and Gauss-Krueger geographical projection is calculated automatically from the center of the area of interest. This value can manually be modified.
- Two delivery formats for the data products are actually offered:
    - Images in PNG format. PNG is a standard image format which can easily be imported into other applications such as MS Word, etc.

- Product data in the band interleaved by line (BIL) binary format. This is the exchange data format with the SISCAL end-user GIS. Data in BIL format may also be directly integrated into a number of image processing and GIS systems such as ERDAS IMAGINE, ESRI ArcGIS, etc.

Further image or data formats can be made available on request.

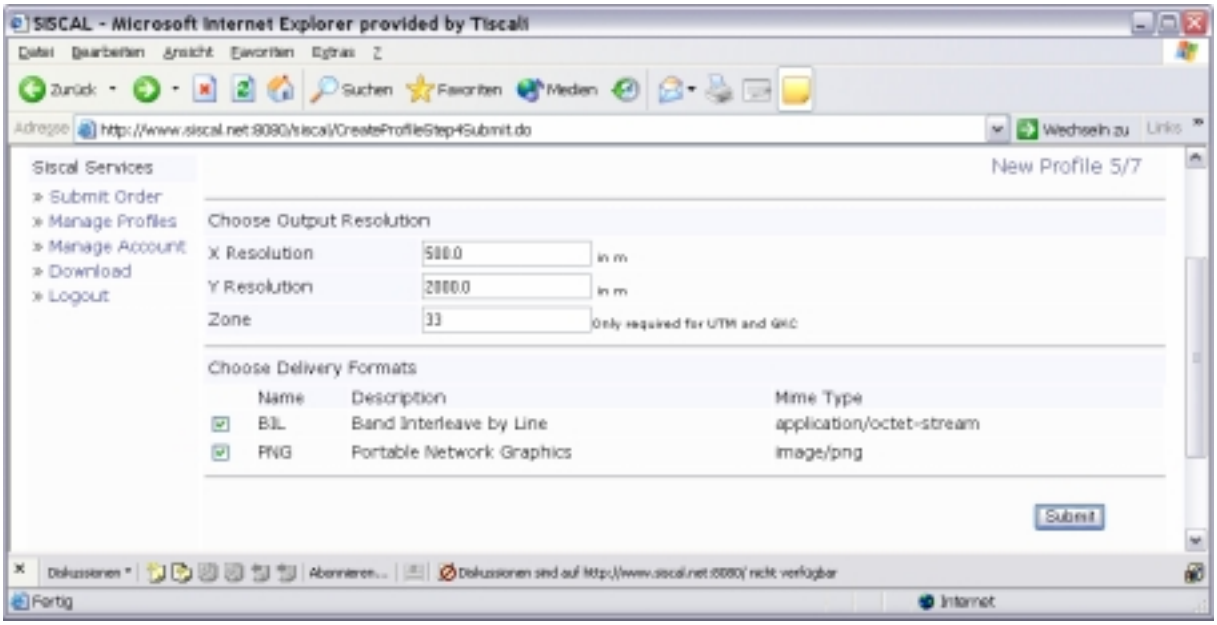

Figure 18: Fifth step of profile creation – output specifications.

3.2.6 Step 6 of 7: ancillary processing schemes

In the sixth step of profile creation, the ancillary processing parameters need to be specified. These concern the three fields:

- Ancillary data processing;
- Atmospheric correction processing;
- Mask data processing.

In the default demonstration mode, only one processing scheme is available for each field. Therefore, each processing scheme has to be checked. Advanced users under the operational mode have a choice e.g. between different atmospheric correction modules.

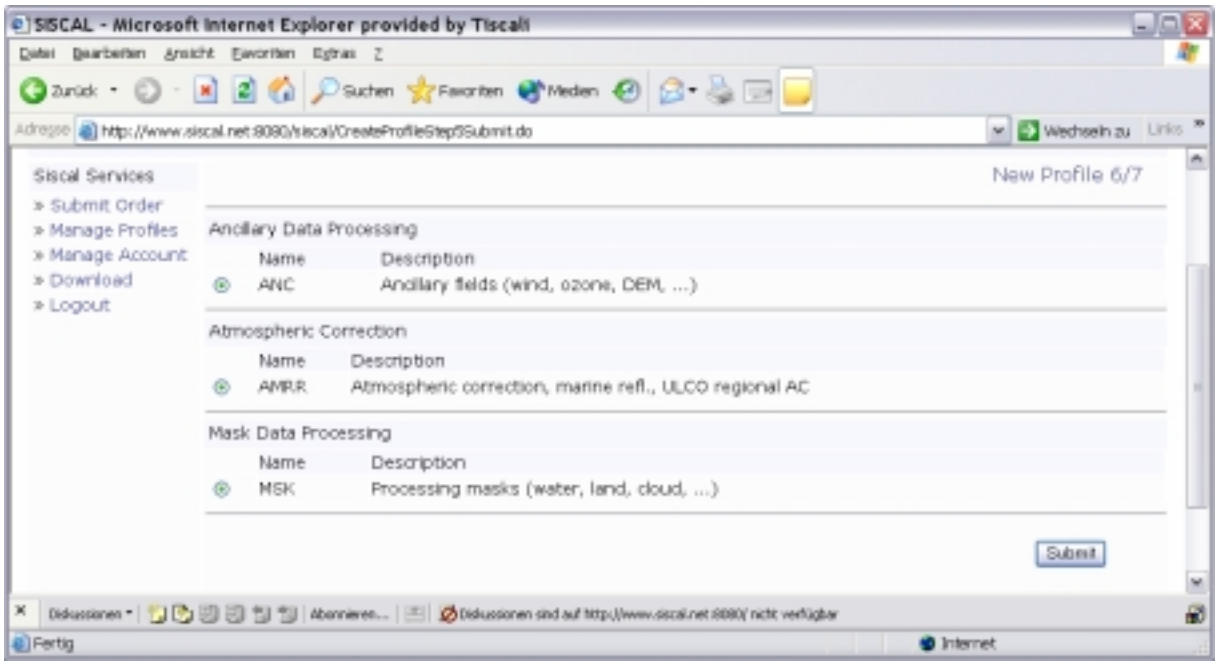

Figure 19: Sixth step of profile creation – ancillary processing schemes.

3.2.7 Step 7 of 7: profile summary and submission

In the seventh and last step of profile creation, the previously submitted information is listed. In case all entries are correct, the user can submit the profile which is then entered into the SISCAL database.

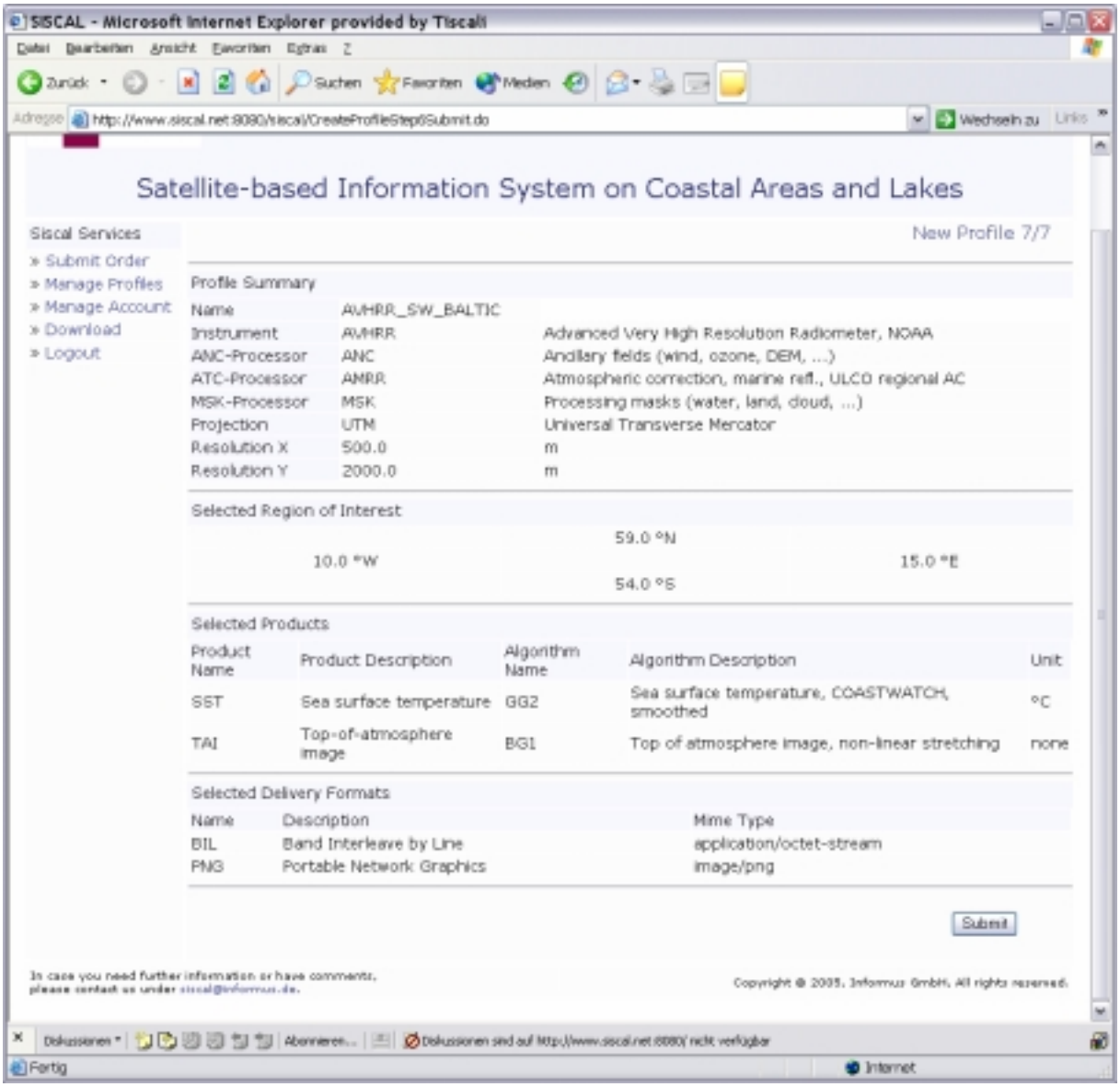

Figure 20: Seventh step of profile creation: final submission for entering into the database.

3.2.8 Removing profiles

Profiles can not be altered but only be removed. The dialogue for removing profiles is accessed through the "*Manage Profiles*" menu entry (see orange arrow on Figure 13).

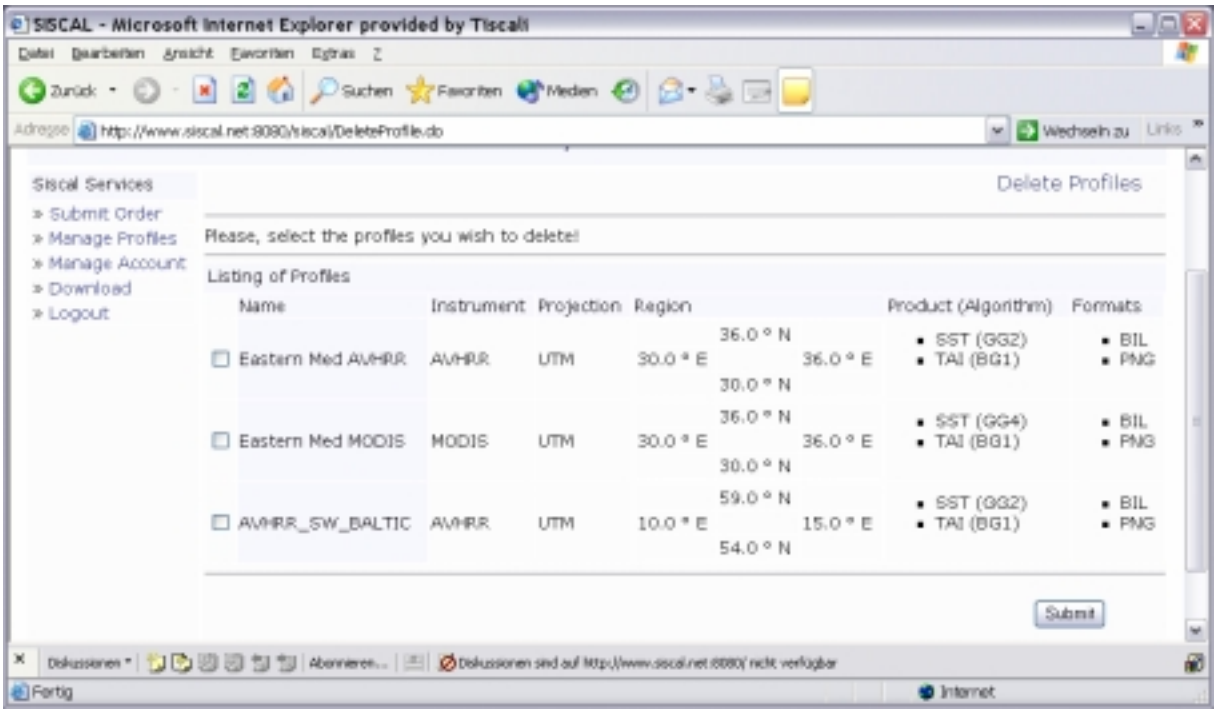

Figure 21: User interface for removing profiles. The interface is accessed through the "Manage Profiles" menu entry or directly through http://www.siscal.net:8080/siscal/DeleteProfile.do.

3.3 Product ordering

Products can only be ordered for previously established profiles. Product ordering is done through definition of "*requests*" encompassing a time span of up to one month. One request can therefore comprise one or more "*jobs*", where a job comprises all the products derived from one satellite image for the given profile. Users operating under the demonstration mode are granted a portfolio of typically 100 "jobs".

The product ordering procedure is accessed via **"Submit Order"** menu entry. Product ordering consists of just three steps, as shown in the following subsections:

- Request specification;
- Satellite overpass selection;
- Request submission.

3.3.1 Step 1 of 3: request specifications

In the first step of product ordering, the customer selects one of the pre-defined profiles and indicates the time range for which the products are sought.

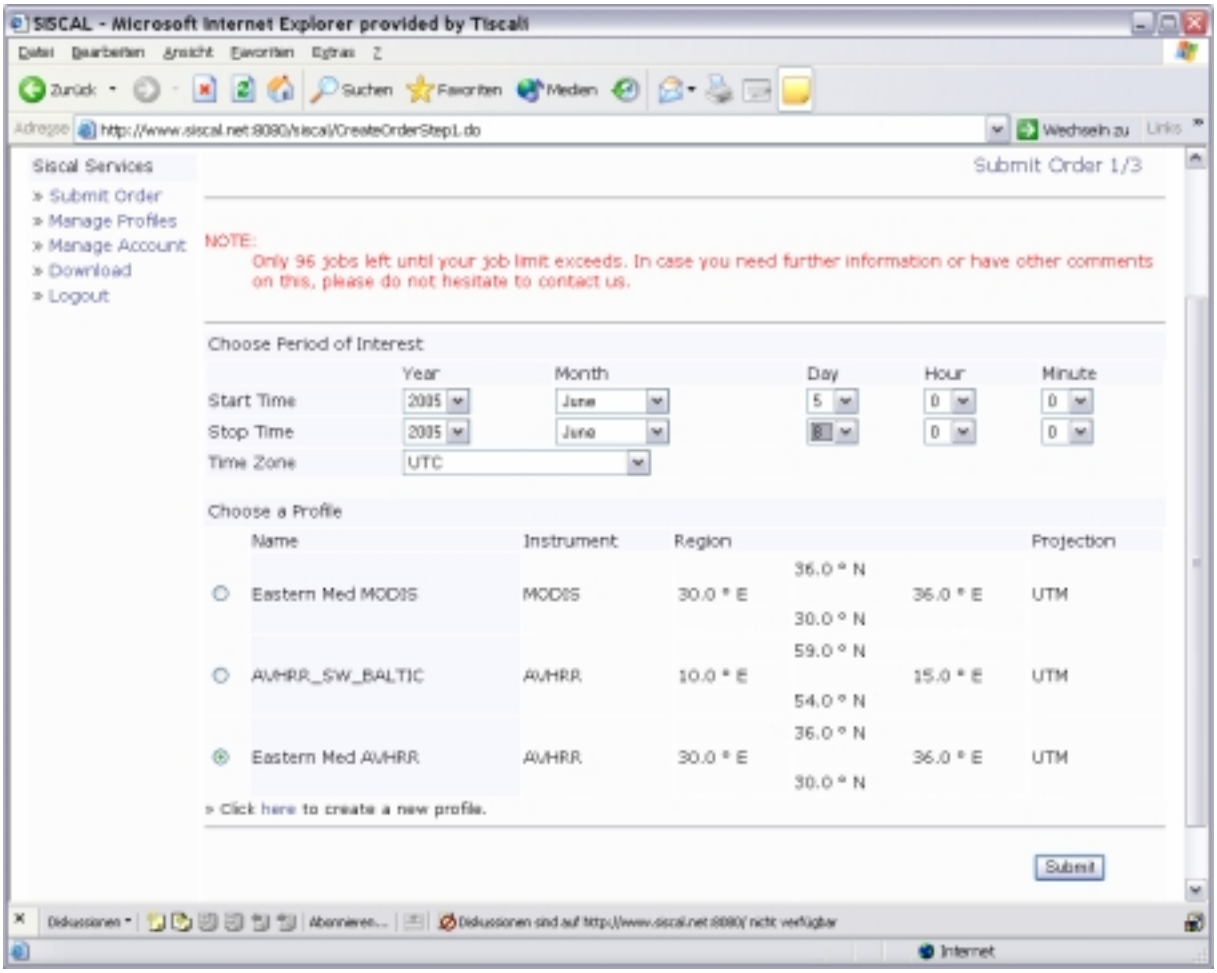

Figure 22: First step of product ordering – specifying profile and temporal range.

3.3.2 Step 2 of 3: Overpass selection

In the second step, the SISCAL system determines the available satellite overpasses. This is done by:

1. determining the time of the satellite overpasses over the area of interest within the specified time span from orbital parameters, and then
2. comparing the resulting overpass times with
    a. the actual availability within the local archive, and
    b. the expected availability for external archives

The user is then offered a list of all available overpasses among which the best suited need to be chosen. Two considerations should be made when choosing among overpasses:

- Data available locally should be preferred, since no download from an external ftp server is required (by far the most time consuming step in the processing chain) and also since their existence is assured (see below)
- In case several overpasses are available for the same day, those with higher elevation should be preferred since low satellite elevation usually is associated with lower product quality.

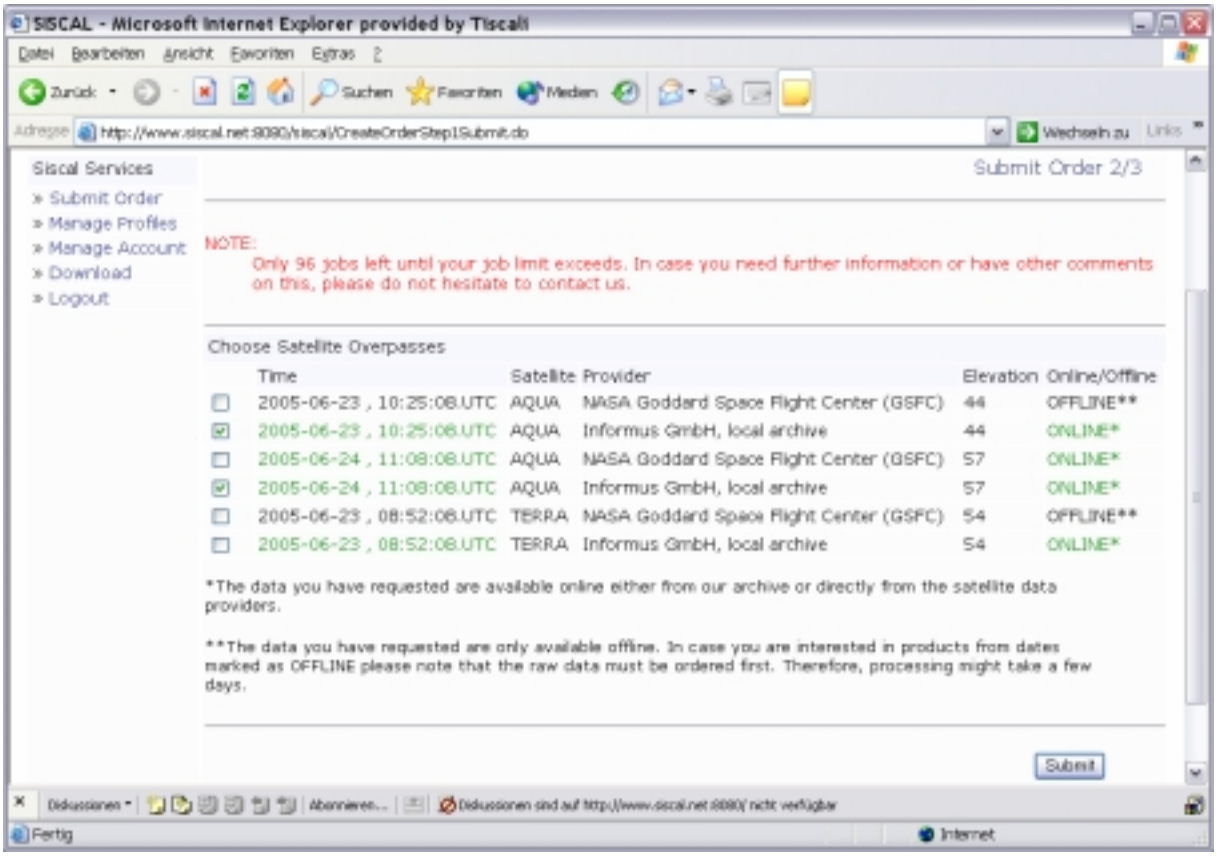

Figure 23: Second step of product ordering – overpass selection.

Some more rules apply to ordering SISCAL data products:

- The time period for which data are selected may not exceed one month. Should you need data products for longer time spans, you need to establish several independent orders.
- Data products may also be ordered for future overpasses. The corresponding processes will be initiated once the required satellite raw data are (likely) available.

The external data providers connected to the SISCAL service are usually operating with a high degree of reliability. However, on rare occasions, data offered to the user during step 2 over the ordering procedure may finally not become available. The reasons for this might be related to e.g. failures of the satellite instrument, of the receiving stations or of the ftp access, etc.

3.3.3 Step 3 of 3: Request submission

The last step of product ordering consists in finally submitting the request. After selecting the overpasses, a panel is shown summarizing the parameters of the request. By clicking the "*Submit*" button, all parameters of the request will be pre-processed and than entered into the SISCAL database.

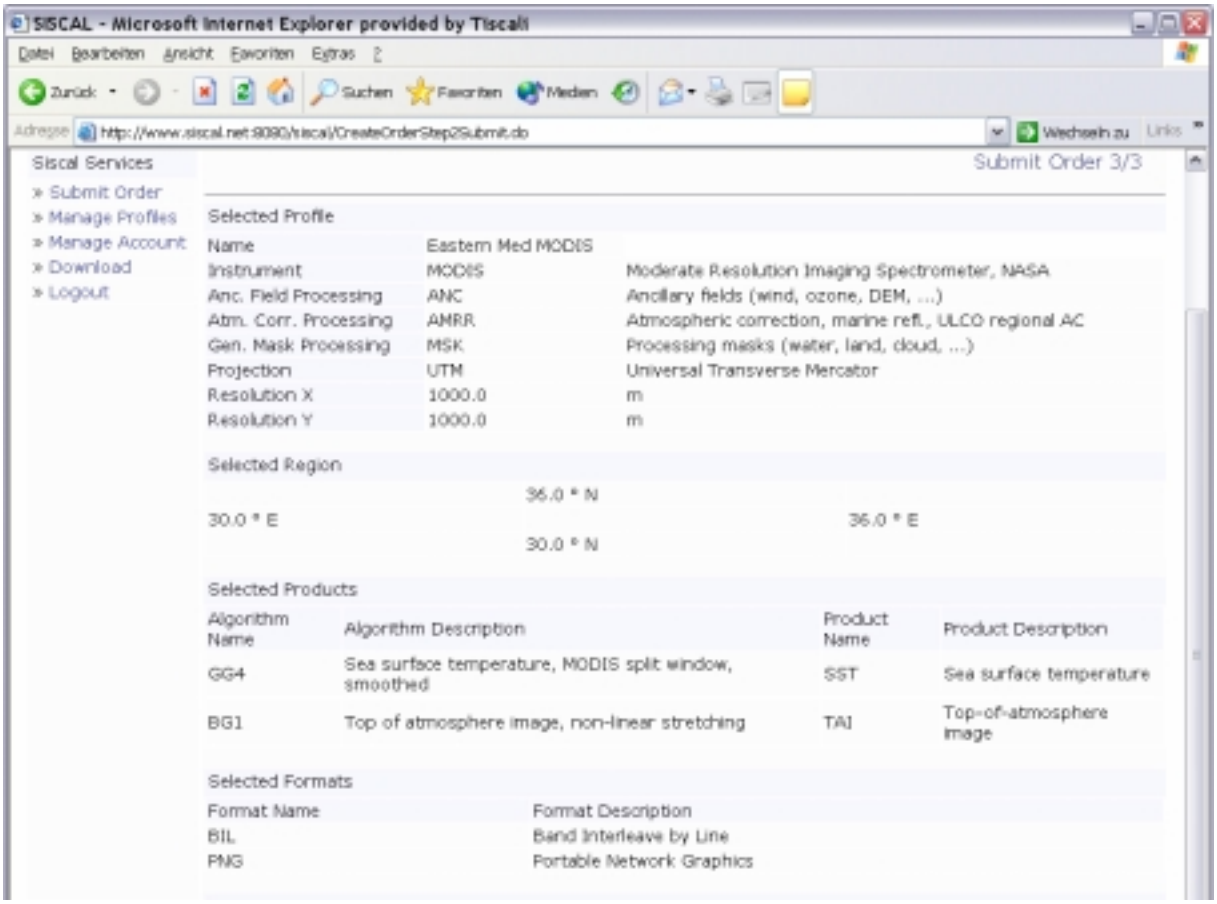

Figure 24: Third step of product ordering – request submission.

Successful submission of the request is confirmed on the website.

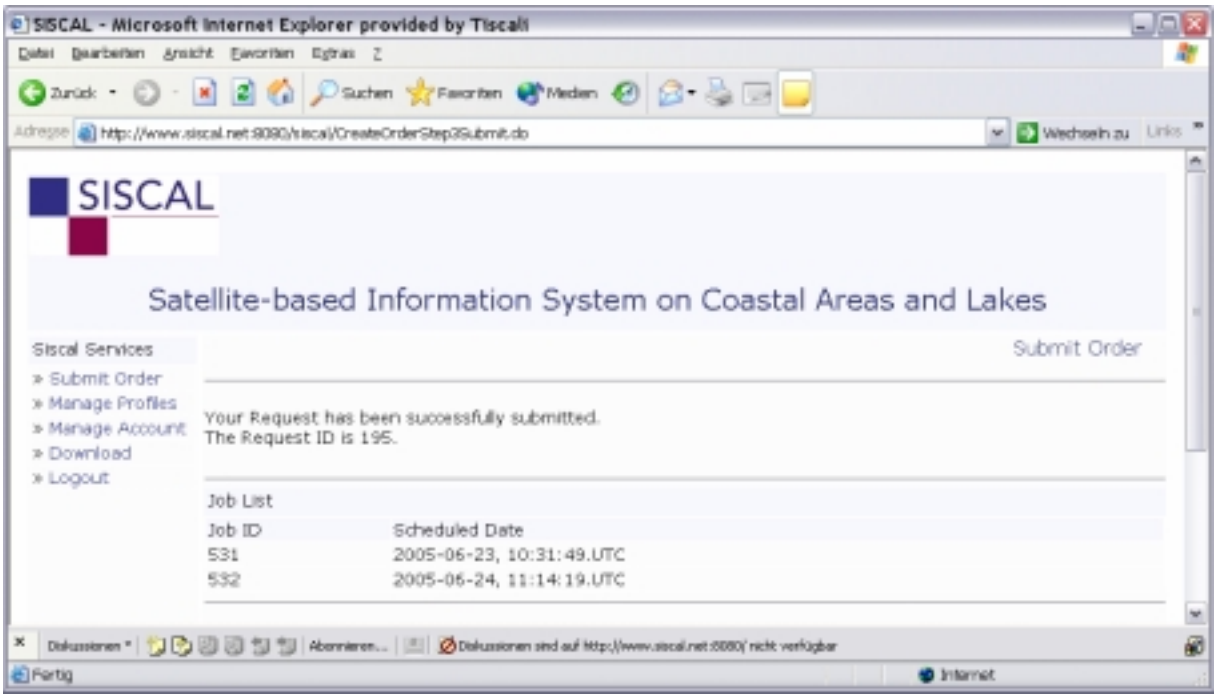

Figure 25: Product ordering - confirmation of request submission.

3.4 Product retrieval

The user is notified by e-mail upon complete termination of a request for data products, once all jobs of the request have been treated. Product retrieval is done in three steps as shown in the following subsections.

3.4.1 Step 1 of 3: Request selection

Clicking on the "*Download*" menu entry will provide a listing of all requests finalised within the last three weeks. For each request, a number of parameters are shown, most importantly the actual status and the date of product removal from the SISCAL download area. Actually, SISCAL products are removed three weeks after completion of a request. In case data products have been removed, resubmission of the corresponding request is required.

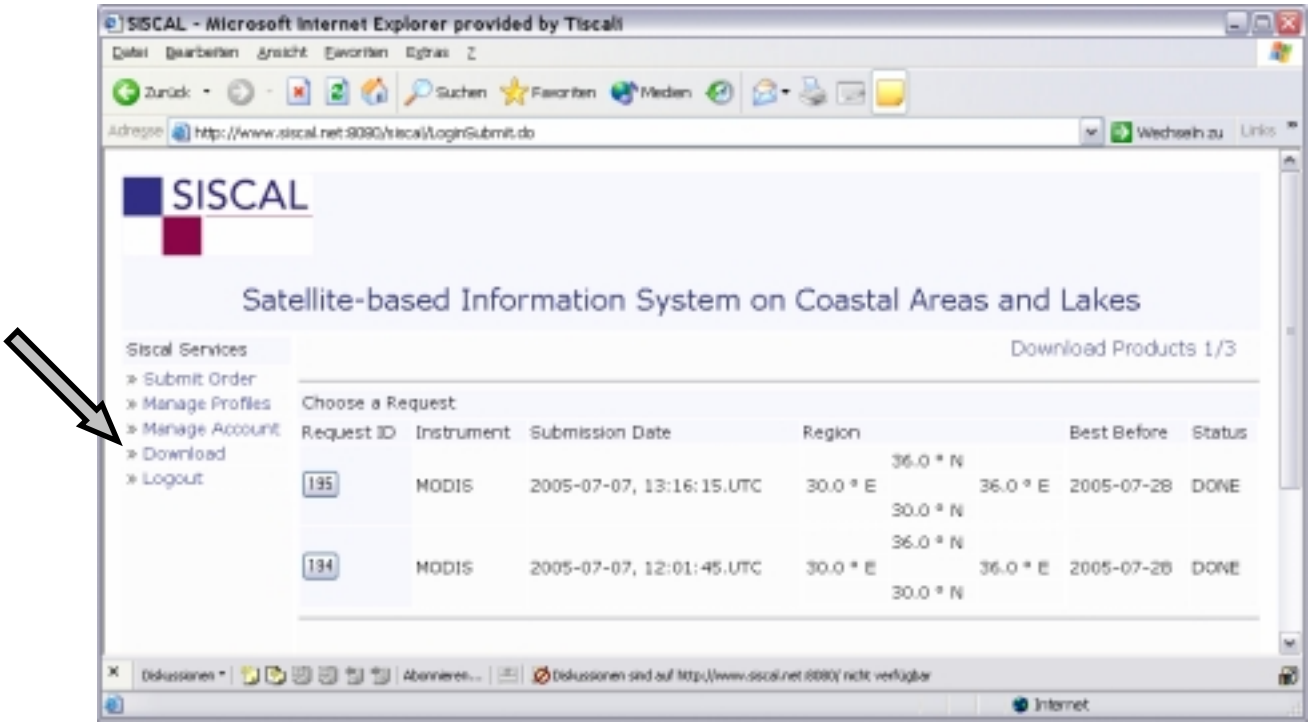

Figure 26: First step of product retrieval – request selection.

3.4.2 Step 2 of 3: Job selection

Clicking on a request ID (left column) lists the jobs corresponding to the request. Again, information is given for each request, most importantly its status. The following status parameters are possible for jobs and requests:

- PENDING: job has been entered into the data base and is awaiting scheduling;
- QUEUED: job has been entered into the queue of a SISCAL execution engine;
- RUNNING: job has been started;
- DONE: job / request has been successfully finished;

- FAILED: Job is finished but processing has failed and no products could be derived.

In order to facilitate product retrieval, all jobs of a request may be downloaded at once by clicking on the appropriate link (see green arrow in Figure 27). All products of the request (which itself may consist of 1 to *n* jobs) will then be packed into one single zip-archive. Alternatively, a request may also be deleted (see orange arrow in Figure 27).

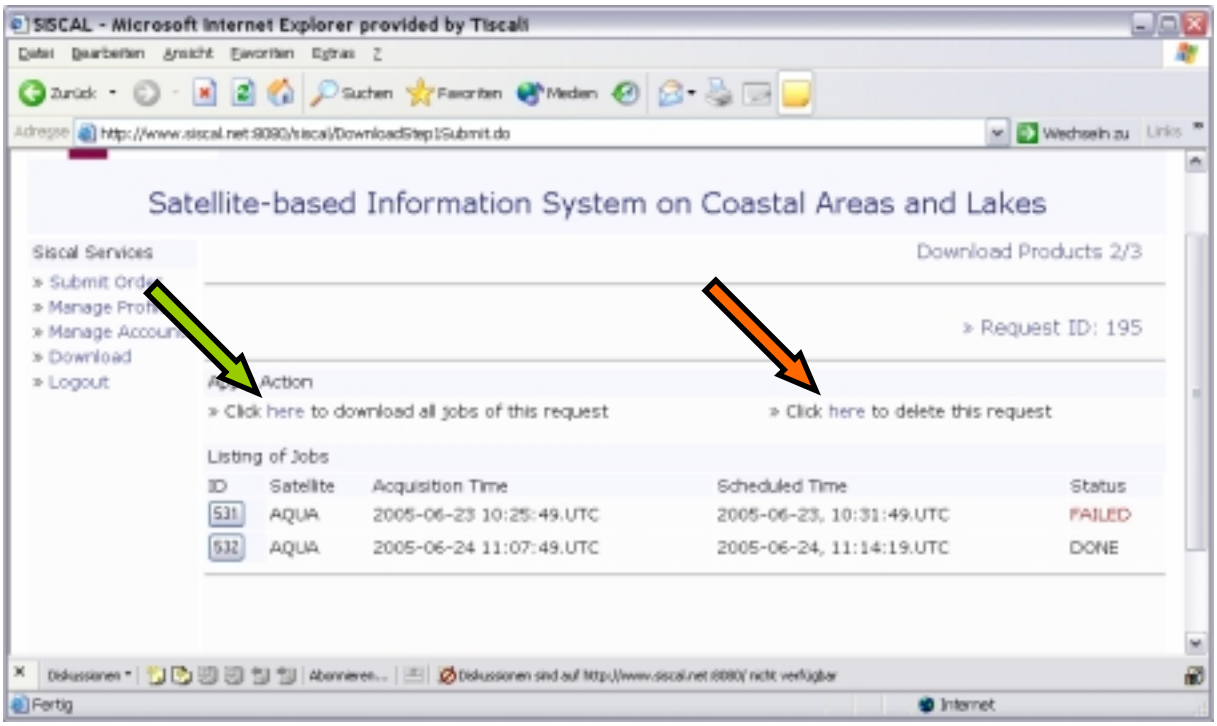

Figure 27: Second step of product retrieval – job selection.

3.4.3 Step 3 of 3 – product selection

Clicking on a job ID lists all products generated in the frame of the corresponding job. For each product, a quick-look is shown and information on the product quality is provided. This information is intended to assist the user whether a product is worth downloading or not.

Products can be retrieved individually by clicking on the links on the right side of the list. Alternatively, all products of a job can be retrieved as one single zip-archive.

Indications on product quality are provided by two means: First, the results of pixel classification are given in relative amounts of cloud covered, land surface and unclassifiable pixels. For the remaining pixels, which have been classified as clouds, estimates of the product quality are indicated. These quality estimates take the actual situation during the satellite overpass into account. Parameters considered for estimating product estimates comprise e.g.:

- Solar zenith angle;
- Observation zenith angle;

- Distance from the coast;
- Atmospheric turbidity / atmospheric moisture;
- Validity range of algorithm.

In case the data quality is insufficient, a job can be deleted. In contrast to that, single products of a job can't be deleted.

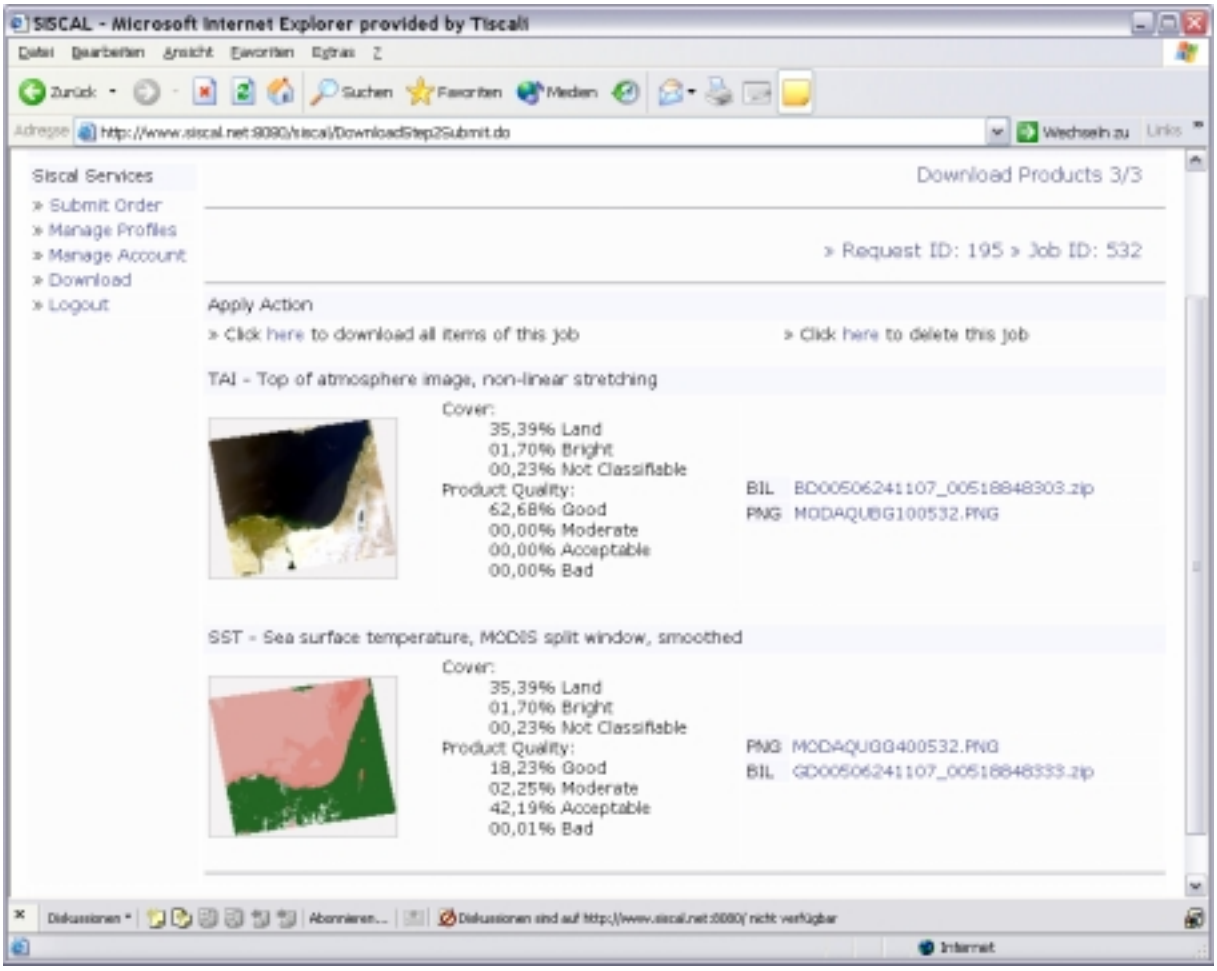

Figure 28: Third step of product retrieval – product selection.