Table 2: Input/output variables, files and parameters required by each DAFNE module.

Module	Input	Output
`image_segmentation`	**Mandatory variables**: • a 3 dimensional array of size (r, c, m_i), containing the $I_{i,j}; j = 1, \ldots, m_i$ imagery data, each of size $r \times c$ (rows×columns), or a string corresponding to the name of a text file containing the list of the corresponding m_i GeoTIFF files. **Optional variables:** • the number K_i of the possible states of the C_i variable (if absent it is set to the default value: $K_i = 8 \cdot m_i$); • a flag with two possible values: 1: in this case, two text files are produced as output, respectively reporting the μ_{C_i} values and the $p(C_{i,j})$ values. The files are named, respectively, '`mu_C.txt`' and '`p_C.txt`'; 2: in this case, also K_i GeoTIFF files reporting, for each pixel, the $p(I_i = I_i^*\|C_{i,j})$ value are produced as output. These files will be automatically named as '`p_I_C<j>.tif`', with $j = 1, \ldots, K_i$. This output is possible only if the input data have been provided as GeoTIFF files. • a string of characters to be inserted as identifier in the names of the output files produced if the previous flag is set. The names of the files in this case will be '`mu_C_<string>.txt`', '`p_C_<string>.txt`', and, optionally '`p_I_Cj_<string>.tif`'.	**Mandatory variables**: • a 2 dimensional array containing the K_i μ_{C_i} vectors (with length m_i); • a vector of size K_i containing the $p(C_{i,j})$ values, $j = 1, \ldots, K_i$; • a 3 dimensional array of size (r, c, K_i) containing, for each pixel, the $p(I_i = I_i^*\|C_{i,j})$ value. **Optional variables:** • two text files reporting respectively the μ_{C_i} values and the $p(C_{i,j})$ values; • K_i GeoTIFF files, reporting, for each pixel, the $p(I_i = I_i^*\|C_{i,j})$ value,$j = 1, \ldots, K_i$.

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Module	Input	Output
`electromagnetic_ modeling`	**Mandatory variables**: • a string pointing to a text file containing for each image $I_{i,j}; j = 1, \ldots, m_i$, the acquisition date and a (1/0) flag, set respectively to 1 if the image contains a flood event, or to 0 otherwise. An example of this file organization is reported in Fig. 4(a). The text file rows must be sorted in the same order as the images in input to the `image_segmentation` module; • a string indicating the imagery source type (available options: '`int`', '`coh`', '`ndvi`'); • the 2 dimensional array having, in each row, the μ_{C_i} vectors, or a string pointing to a text file reporting them. **Optional variables:** • the threshold value for the considered data source (default values in Table 1); • a row vector containing three threshold parameters, if the double bounce effect has to be considered; • a flag variable, set equal to 1 if an output text file containing the vector with the $p(F = \text{flood}\|C_{i,j})$ probability values is requested as output. This file contains each flood date (in the '`mmm/dd/yyyy`' format, previously specified) followed by the corresponding $p(F = \text{flood}\|C_{i,j})$ vector. This file will be automatically named '`P_F_Cj_<img_type>.tif`'.	**Mandatory variables**: • a structure containing the vector with the $p\big(F\|C_{i,j}\big)$ probability values, for each input image depicting a flood event. The field names of this structure are the corresponding acquisition dates, in the format '`mmm_dd_yyyy`', where the month is written in letters (for example, '`Nov_03_2010`'). Each field contains a vector of size K_i. **Optional variables:** • a text file containing, for each input image depicting a flood event, the acquisition date followed by the vector with the $p\big(F\|C_{i,j}\big)$ probability values.

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Module	Input	Output
`image_modeling`	**Mandatory variables**: • a 3 dimensional array containing, for each pixel, the $p(I_i = I_i^*\|C_{i,j})$ value or a string pointing to a text file containing the list of K_i GeoTIFF files reporting these data; • a vector containing the $p(C_{i,j})$ values or a string pointing to a text file reporting it; • a structure containing, in each field, the vector with the $p\big(F\|C_{i,j}\big)$ probability values, for each image acquired during a flood event or a string pointing to a text file containing the acquisition date followed by the vector with the corresponding $p\big(F\|C_{i,j}\big)$ probability values. **Optional variables**: • a flag (set equal to 1) indicating if GeoTIFF files have to be provided as output. This output is possible only if the input data have been provided as GeoTIFF files. For each flood date in which data are available, two GeoTIFF files are generated as output; they report, for each pixel, the $p(I_i = I_i^*\|F)$ and the $p(I_i = I_i^*\|NF)$ values, respectively. These files will be automatically named '`p_I_F_<mmm_dd_yyyy>.tif`' and '`p_I_NF_<mmm_dd_yyyy>.tif`', where '`<mmm_dd_yyyy>`' is the corresponding acquisition date; • a string of characters to be inserted as identifier in the names of the output files produced if the previous flag is set. The names of the files in this case will be '`p_I_<string>_F_<mm_dd_yyyy>.tif`' and '`p_I_<string>_NF_<mm_dd_yyyy>.tif`'.	**Mandatory variables**: • a structure containing, in each field, the vectors with the $p(I_i = I_i^*\|F = \text{flood})$ and the $p(I_i = I_i^*\|F = \text{no flood})$ probability values, for each input image depicting a flood event. The field names are the corresponding acquisition dates. **Optional variables:** • two GeoTIFF file reporting respectively, for each pixel, the $p(I_i = I_i^*\|F = \text{flood})$ value and the $p(I_i = I_i^*\|F = \text{no flood})$ value, for each input image depicting a flood event.

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Module	Input	Output
ancillary_data_modeling	**Mandatory variables**: • a 2 dimensional array of size (r, c) containing the ancillary information, or a string pointing to the corresponding GeoTIFF file; • a text flag reporting the ancillary datum type (available options: '`distance`','`gfi`'); • a string pointing to a text file reporting each date in which the ancillary information is available (indicated as '`mmm_dd_yyyy`') and the corresponding two input parameters for the model function: in the case of sigmoidal functions, the first parameter is the σ_k value, the second one the μ_k value. An example of this file organization is reported in Fig. 4(b); • a flag reporting the model function chosen (available options: '`linear`', '`sigmoidal`'); **Optional variables:** • a flag (set equal to 1) indicating if GeoTIFF files have to be provided as output. This output is possible only the input data have been provided as GeoTIFF files.	**Mandatory variables**: • a structure containing, in each field, the array of size (r, c) with the $p(F\|A_k)$ probability values, for each date in which the considered ancillary datum is available. The field names are the corresponding acquisition dates ('`mmm_dd_yyyy`'). ; **Optional variables**: • a GeoTIFF file reporting, for each pixel, the $p(F\|A_k)$ value, for each date in which the considered ancillary datum is available. Each file is automatically named as '`p_A_<type>_F_<mmm_dd_yyyy>.tif`', where `<type>` is the considered data type (e.g. '`gfi`') and '`<mmm_dd_yyyy>`' the corresponding date.

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Module	Input	Output
`probabilistic_flood_map_computation`	**Mandatory variables**: • the number of available imagery data sources; • the number of ancillary data types; • for each imagery data source, a structure containing the vectors with the $p(I_i = I_i^*\|F = \text{flood})$ and the $p(I_i = I_i^*\|F = \text{no flood})$ probability values, or a string pointing to a text file containing the acquisition date, followed by the names of the GeoTIFF files reporting respectively, for each pixel, the $p(I_i = I_i^*\|F = \text{flood})$ value and the $p(I_i = I_i^*\|F = \text{no flood})$ value. An example of this file organization is reported in Fig. 4(c); • for each ancillary data type, a structure containing the arrays with the $p(F\|A_k)$ probability values, or a string pointing to a text file containing the acquisition date, followed by the name of GeoTIFF file reporting, for each pixel, the $p(F\|A_k = A_k^*)$ value; **Optional variables:** • a flag (set equal to 1) indicating if GeoTIFF files have to be provided as output.This output is possible only at least one input has been provided as GeoTIFF file.	**Mandatory variables**: • a structure containing the vector with the $p(F = \text{flood}\|I_1 = I_1^*, \ldots, I_M = I_M^*, A_1 = A_1^*, \ldots, A_N = A_N^*)$ probability values, for each date in which there is flood. **Optional variables:** • a GeoTIFF file reporting, for each pixel, the $p(F = \text{flood}\|I_1 = I_1^*, \ldots, I_M = I_M^*, A_1 = A_1^*, \ldots, A_N = A_N^*)$ value, for each date in which there is flood.Each files is automatically named as '`p_F_map_I_<M>_A_<N>_<mmm_dd_yyyy>.tif`', where `M` and `N` are the number of available imagery data sources and ancillary data, respectively, and '`<mm_dd_yyyy>`' the map date.