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Utility Software for Web-Based PPP Applications for Automated Data Processing

Presenter : Behlul N. Ozdemir

Selcuk University  

Behul N. OZDEMIR, Salih ALCAY, Cemal O. YIGIT, Ayhan CEYLAN Turkey

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Introduction : PPP

Precise Point Positioning (PPP) is a positioning method that employs Global Navigation Satellite System (GNSS) products, e.g. obtained via the international GNSS service (IGS), to perform point positioning using single GNSS receiver. Whilst the PPP technology was first introduced in 1976, since 1990s it was extensively researched and several online PPP services and software packages have been developed. CSRS-PPP, Magic GNSS and GAPS are the examples of web based GPS/GNSS-PPP software's.

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Introduction : PPP

While using web based software, it is necessary to upload the observation data to the systems. If the observation data of IGS stations are used, such data should be downloaded from many different websites. However during the batch process, systems limit the users in terms of file sizes. Thus downloading and uploading processes take a lot of time. To overcome this problem a software was developed by authors. In the present study the features of the software, which is called Quick PPP Software, was introduced in a detailed way.

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Features and GUI of the Quick PPP Software

This utility software, developed by authors, facilitates the usage of the PPP based applications that makes the process steps fast and automated. Basic principle of the software is to getting the observation files from defined server, such as the SOPAC , or from users computer, uploading them to the CSRS-PPP servers and creating estimated coordinates list file based on the process results from CSRS-PPP.

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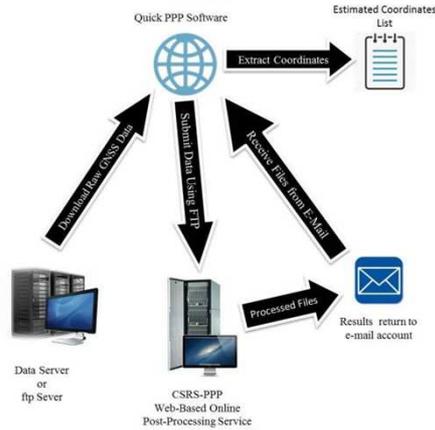




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Main Working Scheme



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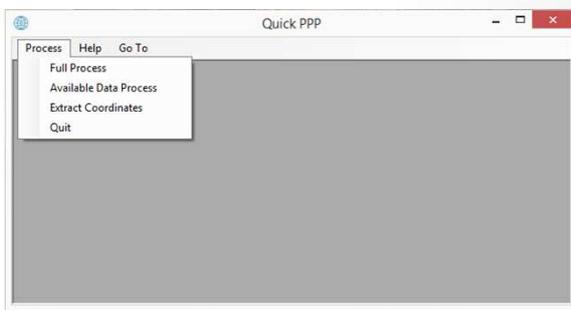
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MainScreen and MainMenu



Main screen of the software has three menu items including Process, Help and Go To options. In the "Help" menu, user can find required information about the software. "Go To" menu provides shortcuts to the SOPAC and CSRS-PPP websites.

"Process" menu have three different process options including "Full Process", "Available Data Process" and "Extract Coordinates".

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Full Process Module



"Full Process" consists of five main sections. These are Input field, Activity Log, Site List, GNSS Selection, Estimated Coordinates and Site Map.

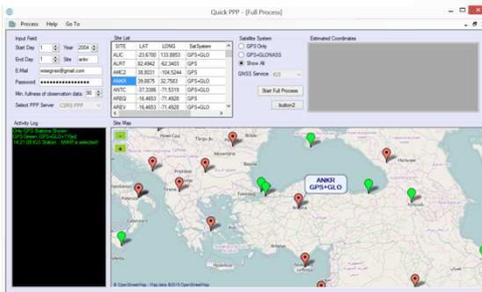
While Site List includes all IGS stations, Site Map represents the location of the stations. This map is provided by OpenStreetMap, which is widely used as an open source map provider. GNSS Selection part is used in order to filter the stations according to the GPS or GPS+GLONASS receivers.



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Full Process Module



In order to RUN the program user can whether enter the four digit site code in the Site box or pick a station from the Site Map. While hovering the cursor to a marker, the site name and the corresponding satellite systems are displayed. In addition user can filter the sites according to the satellite system in the Site Map choosing the GNSS selection part. GPS receivers are shown as Green markers and GPS+GLONASS receivers are represented by red markers.





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Site Map Features



If the user select any site from the site list ,map window centers the location of corresponding site and zooms into it.

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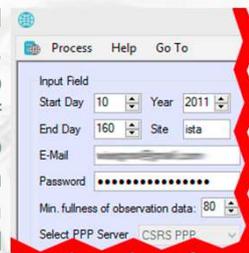


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Starting the Batch Process

After selecting the station, user should input the SDOY, EDOY and «Year» values to the corresponding boxes in the input field. Besides, user may prefer entering a minimum value according to the fullness of the observation data in the "Min. Fullness of observation data: ..." part to prevent uploading observation file to the PPP server. It is possible to start either a simple process with single day data or choose multiple observation data to start a batch process. Run button starts the process if the input data is entered correctly. After this step, no user interaction is required. Software connects to the SOPAC servers to check observation files and downloads them if available.



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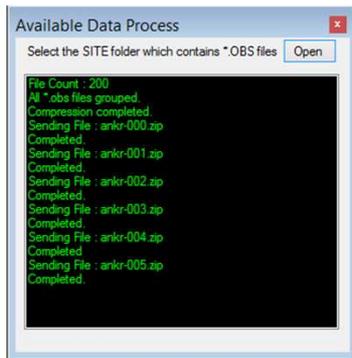




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Available Data Process



Besides "Full Process", user have an option to choose previously downloaded observation data from the "Available Data Process" sub menu. This will make possible a folder selection that includes already available observation files. By reading the folder content, software will start a similar process (Single or Batch) explained in the "Full Process".

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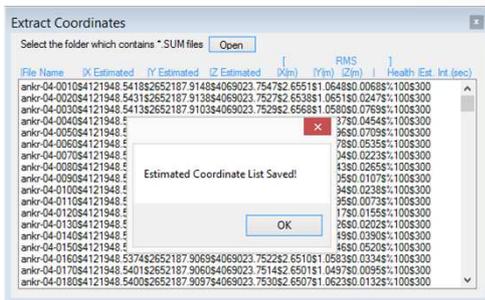
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Extracting Coordinates



"Extract Coordinates" option provides user to read and save the estimated coordinates, processed earlier by CSRS PPP, by selecting a folder which includes *.sum files.

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Conclusion

This software has been developed in order to simplify the usage of online PPP software and in order to generate daily GPS/GNSS time series, which is long-term, based on PPP method. The software is to accelerate the batch file process and provide more options to the users. By the help of the software, it is possible to process long-term observations of the GNSS stations that would allow the users to predict the velocity of the stations. Using long-term observation data, displacements in the points related to the many factors such as earthquake, could be determined. In the future work, besides CSRS-PPP, JPL Gipsy and Magic GNSS software is going to be included. We also aim to add time series analysis menu in order to estimate site velocity and to detect automatically a coordinate changes caused by possible earthquake or landslide. Therefore, this new version of the software can be used as natural hazard alert system for continuously monitoring project, such as landslide.



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End of Presentation

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Dankie Gracias شكرا
Спасибо
Köszönjük Merci Takk
Grazie Dziękujemy Terima kasih
Dakujeme Vielen Dank Dékojame Paldies
Kiitos Täname teid 谢谢
Thank You Tak
感謝您 Obrigado Teşekkür Ederiz
Σας ευχαριστούμε 감사합니다
Bedankt Děkujeme vám
ありがとうございます
Tack



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