

# JIHYE PARK

Assistant professor of Geomatics  
School of Civil and Construction Engineering  
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## EDUCATION

<b>Ph.D.</b>	Geodetic Science & Surveying	The Ohio State University	2012
<b>M.S.</b>	Geodetic Science & Surveying	The Ohio State University	2010
<b>M.S.</b>	Geoinformatics	The University of Seoul	2006
<b>B.S.</b>	Geoinformatics	The University of Seoul	2004

## PROFESSIONAL EXPERIENCE

### **Oregon State University, Corvallis, OR**

- Assistant Professor (October 2015 – present)

### **The Ohio State University, Columbus, OH**

- Research Fellow (March, 2015 – October 2015)
  - Project: Using Combined GPS and Low-Frequency Interferometry Data to Discriminate Traveling Ionospheric Disturbances from Large Chemical and Underground Nuclear Explosion, funded by U.S. Naval Research Lab (NRL)
  - Project MImOSA2: Monitoring Ionosphere Over South America to support high precision applications, funded by ESA (European Space Agency)

### **The University of Nottingham, Nottingham, UK**

- Research Fellow (January, 2013 – February, 2015)
  - Project CALIBRA: Countering GNSS high accuracy applications limitations due to ionospheric disturbances in Brazil (<http://www.calibra-ionosphere.net/>), funded by the European GNSS Agency, within the European Union's Seventh Framework Programme under grant agreement No. 287201.

### **The Ohio State University, Columbus, OH**

- Post-doctoral Researcher (September 2012-December 2012)
  - Ionospheric detection of earth geophysical activities using GPS
- Graduate Research Associate (January 2007- August 2012)
  - GPS remote sensing: Investigation of the ionospheric disturbances from the underground nuclear explosion, 2009 – 2012
  - Troposphere modeling for improved GNSS positioning 2009 – 2012
  - GPS and image analysis support: Ancient Human Social Dynamic (AHSD) project funded by the National Science Foundation (NSF), 2007 – 2010

## **PROFESSIONAL SERVICE**

- **Journal Editorships**
  - Editorial committee for Journal of Positioning, Navigation, and Timing (PNT) by Institute of PNT
  - Editorial advisory board for GPS solutions
- **Conference and Workshop Organization**
  - Institute of Navigation (ION) GNSS+ 2018, 24-28 September 2018, Miami, FL, USA (Track Chair)
  - SaGES2017, July 30 – August 3, Oregon State University, Corvallis, OR, USA (Organizer, Session moderator)
- **Reviewer:**

Acta geodynamica et geomaterialia; ANGIO (Annales Geophysicae); IEEE Aerospace and Electronic Systems Society (IEEE AESS); IEEE Transactions on Intelligent Transportation Systems (IEEE ITS); IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (IEEE JSTARS); IEEE Geoscience and Remote Sensing letter (IEEE GRSL); International Association of Geodesy Symposia (IAGS); International Journal of Geo-information (ISPRS Int. J. Geo-Inf); Journal of Geodetic Sciences; Journal of Surveying Engineering; Radio Science; Remote Sensing; Review of Geophysics; Sensors; Survey Review; Surveying and Land Information Science (SaLIS); NSF Proposal (program: Aeronomy in April 2019)
- **Memberships:** The Institute of Navigation (ION), American Geophysical Union (AGU), International Association of Geodesy (IAG) Working Group 4.5.2: Precise Point Positioning and Network-RTK, American Society of Civil Engineers (ASCE), American Society of Photogrammetry and Remote Sensing (ASPRS), Professional Land Surveyors of Oregon (PLSO), Korean Oceanographic & hydrographic Association

## **QUALIFICATIONS**

- Programming languages: Matlab, C++
- GPS software: Trimble Geomatics Office, TEQC, PAGES, Bernese
- Photogrammetry software: ERDAS IMAGINE, ERDAS LPS, SOCET SET, PCI Geomatics
- GIS software: ArcGIS

## **PUBLICATIONS**

### **• Peer-Reviewed Journal Papers:**

- [1] Huang, C. Y., J. F. Helmboldt, J. Park, T.R. Pedersen, R. Willemann (2019), Ionospheric Detection of Explosive Events. *Reviews of Geophysics*, 57. <https://doi.org/10.1029/2017RG000594>.
- [2] Park\*, J., A. Shahbazi, S. Kim, R. Oberg (2019), Ionospheric response to the total solar eclipse of 21 August 2017 and its impact on GNSS positioning, *Journal of Surveying Engineering*, 145(2): 05019001, [https://doi.org/10.1061/\(ASCE\)SU.1943-5428.0000270](https://doi.org/10.1061/(ASCE)SU.1943-5428.0000270).
- [3] Kim, S.K., J. Park\*, D. Gillins, M. Dennis (2018), On determining orthometric heights from a corrector surface model based on leveling observations, GNSS, and a geoid model, *Journal of Applied Geodesy*, doi:10.1515/jag-2018-0014.
- [4] Park\*, J., V. Sreeja, M. Aquino, L. Yang, C. Cesaroni (2017), Mitigation of ionospheric effects on GNSS positioning at low latitudes, *Navigation*, 64(1), Spring 2017, pp. 67-74.
- [5] Park\*, J., V. Sreeja, M. Aquino, C. Cesaroni, L. Spogli, A. Dodson, and G. De Franceschi (2016), Performance of ionospheric maps in support of long baseline GNSS kinematic positioning at low latitudes, *Radio Sci.*, 51, doi:10.1002/2015RS005933.
- [6] Park\*, J., D. A. Grejner-Brzezinska, R. R. B. von Frese, and Y. Morton (2014), GPS discrimination of traveling ionospheric disturbances from underground nuclear explosions and earthquakes, *Navigation*, 61: 125–134. doi: 10.1002/navi.56.
- [7] Park\*, J., J. Helmboldt, D. A. Grejner-Brzezinska, R. R. B. von Frese, and T. L. Wilson (2013), Ionospheric observations of underground nuclear explosions (UNE) using GPS and the Very Large Array, *Radio Sci.*, 48, doi:10.1002/rds.20053.
- [8] Schuetter, J., P. Goel, J. McCorriston, J. Park, M. Senn, and M. Harrower (2013), Autodetection of ancient Arabian tombs in high-resolution satellite imagery, *International Journal of Remote Sensing*, 34(19), doi:10.1080/01431161.2013.802054.
- [9] Park\*, J., R. R. B. von Frese, D. A. Grejner-Brzezinska, Y. Morton, and L. R. Gaya-Pique (2011), Ionospheric detection of the 25 May 2009 North Korean underground nuclear test, *Geophys. Res. Lett.*, 38, L22802, doi:10.1029/2011GL049430.
- [10] Park\*, J., I. Lee, Y. Choi (2006), Automatic extraction from LIDAR DATA and Digital Maps, *International Journal of Urban Sciences*, 10(1), pp. 19-28.

### **<Submitted/Under review>**

Tahami, H. and J. Park, A study on a short-term forecasting for hurricane-induced precipitation using GNSS-meteorology, *Atmospheric Research*, submitted in August 2019

### **• Peer reviewed Conference papers:**

- [1] Kim, S.K. and J. Park (2019), Monitoring Sea Level Change in Arctic using GNSS-Reflectometry, *Proceedings of the 2019 International Technical Meeting (ITM) of The Institute of Navigation (ION)*, 29 January – 1 February, Reston, Virginia, USA.

- [2] Susi, M., D. Borio, J. Fortuny-Guasch, S.K. Kim, and J. Park (2018), An Experimental Evaluation of Galileo Wideband Signals, Navitec 2018, 5-7 December 2018, ESA-ESTEC, Noordwijk, the Netherlands.
- [3] Tahami, H., J. Park, Y. Choi (2017), The Preliminary study on the prediction of a Hurricane path by GNSS derived PWV Analysis, Proceedings of ION Pacific PNT 2017, 1-4 May, Honolulu, Hawaii, USA.
- [4] Park, J., V. Sreeja, M. Aquino, L. Yang, C. Cesaroni (2015), Mitigation of ionospheric effects on GNSS positioning at low latitudes, *Proceedings of ION GNSS+ 2015*, 14-18 September, Tampa, Florida, USA.
- [5] Cesaroni, C., L. Alfonsi, V. Sreeja, J. Park, R. Romero, N. Linty, D. Barroca, M. C. Ortega (2015), Monitoring Ionosphere over South America: the MImOSA and MImOSA2 projects, *Proceedings of 2015 International Association of Institutes of Navigation World Congress*, 20–23 October 2015, Prague, Czech Republic.
- [6] Bougard, B., A. Simsky, J.-M. Sleewaegen, J. Park, M. Aquino, L. Spogli, V. Romano, M. Mendonça, J. F. Galera Monico (2013), CALIBRA: Mitigating the impact of ionospheric scintillation on Precise Point Positioning in Brazil, *Proceedings of 7th GNSS Vulnerabilities and Solutions Conference*, 18-20 April 2013, Baska, Krk Island, Croatia.
- [7] Park, J., J. Helmboldt, D. A. Grejner-Brzezinska, R. R. B. von Frese, T. Wilson (2013), On Detecting Underground Nuclear Explosions with GNSS and Radio Astronomical Observations, *Proceedings of ION Pacific PNT 2013*, Honolulu, Hawaii, USA (Related article: GNSS and Radio Astronomical Observations: GPS World, <http://gpsworld.com/gnss-and-radio-astronomical-observations/>).
- [8] Park, J., D. A. Grejner-Brzezinska, R. R. B. von Frese, and Y. Morton (2012), Discriminating Underground Nuclear Explosions and Earthquakes in GPS-detected Traveling Ionospheric Disturbances: Case Study, *Proceedings of the ION GNSS 2012*, 17-21 September, Nashville, TN, USA.
- [9] Park, J., D. A. Grejner-Brzezinska, R. R. B. von Frese, Y. Morton, and L. R. Gaya-Pique (2012), On using traveling ionospheric disturbances to detect underground nuclear tests, *Proceedings of the 2012 International Technical Meeting of The Institute of Navigation*, 30 January-1 February 2012, Newport Beach, CA, USA, pp. 1581-1589.
- [10] Grejner-Brzezinska, D. A., C. K. Toth, L. Li, J. Park, X. Wang, H. Sun, I.J. Gupta, K. Huggins and Y. F. Zheng (2009), Positioning in GPS-challenged Environments: Dynamic Sensor Network with Distributed GPS Aperture and Inter-nodal Ranging Signals, *Proceeding of ION GNSS2009*, pp. 111-123.
- [11] Park, J., I. Lee, Y. Choi, Y. J. Lee (2006), Automatic Extraction of Large Complex Buildings using LIDAR Data and Digital Maps, *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, ISPRS, Bonn, Germany, Vol. 36-3, pp. 148-154.
- [12] Park, J., Y. Choi, I. Lee, C.-M. Kim, (2005), Automatic Generation of Building Primitives Using Multi-Source Data, *The 26th Asian Conference on Remote Sensing*

(ACRS), Asian Association on Remote Sensing (AARS), Hanoi, Vietnam.

• **Published conference abstracts:**

- [1] Kim, S.K., J. Park, S. Shin, and E. Lee (2019), Feasibility Study of GNSS-Reflectometry for Tsunami Analysis, AGU fall meeting 2019, 9-13 December 2019, San Francisco, CA.
- [2] Shahbazi, A., J. Park, H. Tahami (2019)., An effective technique for isolation of Traveling Ionospheric Disturbances from GNSS-derived Total Electron Content measurements, CEDAR workshop 2019, 16-21 June 2019, Santa Fe, NM.
- [3] Park, J., S. Kim, N. Wardwell (2018), Water level monitoring in different regions of the U.S. using GNSS-Reflectometry, American Geophysical Union (AGU) Fall meeting 2018, 10-14 December 2018, Washington D.C., <https://doi.org/10.1002/essoar.10500340.1>.
- [4] Park, J., S. Kim, A. Shahbazi, R. Oberg (2017), Ionospheric variation observed in Oregon Real-time GNSS network during the total eclipse of 21 August 2017, American Geophysical Union (AGU) Fall meeting 2017, 11-15 December 2017, New Orleans, LA.
- [5] Shahbazi, A., J. Park, C. Huang (2017), Detection of Traveling Ionospheric Disturbances Induced by 2010 Mindanao Earthquakes, American Geophysical Union (AGU) Fall meeting 2017, 11-15 December 2017, New Orleans, LA.
- [6] Park, J., R.R.B. von Frese, J. Helmboldt, D.A. Grejner-Brzezinska (2016), Detection of Traveling Ionospheric Disturbances (TIDs) from various man-made sources using Global Navigation Satellite System (GNSS), *American Geophysical Union*, 2016 AGU Fall Meeting, 12-16 December 2016, San Francisco, California, USA.
- [7] Cesaroni, C., L. Spogli, G. De Franceschi, L. Alfonsi, V. Romona, M. Aquino, J. Park, J.F.G. Monico (2014), Zonal velocity of the Equatorial ionospheric irregularities over Sao Paolo during the last solar maximum, 17-21 November 2014, 11th European Space Weather Week, Liege, Belgium.
- [8] Park, J., C. Cesaroni, A. Susnik, D.B.M. Alves, M. Aquino, L. Yang, G. De Franceschi, A. Dodson, J.F.G. Monico (2014), Impact of Ionospheric Scintillation on Network RTK Performance at Low Latitude Region, ION GNSS+ 2014, 8-12 September 2014, Tampa, Florida, USA.
- [9] Yang, L., M. Aquino, J. Park, A. Dodson (2014), Tracking Jitter Variance Based Scintillation Mitigation Technique for RTK Rover Processing, ION GNSS+ 2014, 8-12 September 2014, Tampa, Florida, USA.
- [10] Yang, L., J. Park, A. Susnik, M. Aquino, A. Dodson (2013), The impact of ionospheric disturbances on high accuracy positioning in Brazil, *American Geophysical Union*, 2013 AGU Fall Meeting, 9-13 December 2013, San Francisco, California, USA.
- [11] Alfonsi, L., L. Spogli, M. Aquino, B. Bougard, C. Cesaroni, G. De Franceschi, A. Dodson, J. F. G. Monico, L. Yang, J. Park, V. Romano (2013), Scientific questions and

algorithm development in the CALIBRA project, *10<sup>th</sup> European Space Weather Week (ESWW)*, 18-22 November 2013, Antwerp, Belgium.

- [12] Park, J., J. Helmboldt, D. A. Grejner-Brzezinska, R. R. B. von Frese, T. Wilson (2012), Joint GPS and radio astronomical observations of underground nuclear explosions, *American Geophysical Union*, 2012 AGU Fall Meeting, 3-7 December 2012, San Francisco, California, USA.
- [13] Park, J., D. A. Grejner-Brzezinska, R. R. B. von Frese, and Y. Morton (2012), On Traveling Ionospheric Disturbances Induced by Underground Nuclear Explosions and Earthquakes: Case Study, *International GNSS Service Workshop Symposium*, 23-27 July 2012, Olsztyn, Poland.
- [14] Park, J., D. A. Grejner-Brzezinska, Y. Morton, R. R.B. von Frese, L. R. Gaya-Pique (2011), Ionospheric detection of the recent North Korean underground nuclear test, *Comprehensive Nuclear-Test-Ban-Treaty (CTBT) Science and Technology (S&T) 2011*, 8-10 June 2011, Vienna, Austria.
- [15] Park, J., R. R. von Frese, D. A. Grejner-Brzezinska, Y. Morton (2010), Ionospheric Effects of Underground Nuclear Explosions, *American Geophysical Union*, 2010 AGU Fall Meeting, 13-17 Dec. 2010, San Francisco, California, USA
- [16] von Frese, R.R.B., J.W. Kim, H.R. Kim, T.E. Leftwich, E. Rangelova, J. Park, and D.A. Grejner-Brzezinska (2009), Regional geopotential field effects of underground nuclear explosions, Abstract OSI-40/B, CTBTO-ISS09 Conference, 10-12 Jun. 2009, Vienna, Austria.

• **Technical reports:**

- [1] Park, J. et al., [NGS/CIMRS project FY19] New generation, multi-GNSS Processing Capability for the National Geodetic Survey (NGS), User manual for ORPPP, December 2019.
- [2] Park, J. et al., [NGS/CIMRS project FY18] New generation, multi-GNSS Processing Capability for the National Geodetic Survey (NGS), final report, November 2018.
- [3] Park, J. et al., [NGS/CIMRS project FY18] New generation, multi -GNSS Processing Capability for the National Geodetic Survey (NGS), D1 Literature review, March 2018.
- [4] Park, J. et al., [NGS/CIMRS project FY17] Evaluation of static GPS surveying campaigns processed in OPUS-Projects, final report, June 2018.
- [5] Olsen, M. et al, [NGS/CIMRS project FY16] Towards Optimizing the Determination of Accurate Heights using GNSS, Volume 2: Integration of Differential Leveling and GNSS, September 2018.
- [6] Park, J., R. R.B. von Frese, and D. A. Grejner-Brzezinska, Using Combined GPS and Low-Frequency Radio Interferometry Data to Discriminate Traveling Ionospheric Disturbances from Large Chemical and Underground Nuclear Explosions, Deliverable D3 Final report, January 2016.
- [7] Park, J., R. R.B. von Frese, and D. A. Grejner-Brzezinska, Using Combined GPS and Low-Frequency Radio Interferometry Data to Discriminate Traveling Ionospheric

- Disturbances from Large Chemical and Underground Nuclear Explosions, Deliverable D2 Midterm report, June 2015.
- [8] Monico, J.F. Galera, D.B.M. Alves, M.C. Ortega, J. Park, M. Aquino, CALIBRA Deliverable D3.3 NRTK Software, February 2015.
  - [9] Vani, B., M. Aquino, L. Yang, J. Park, J.F. Galera Monico, G. DeFranceschi, L. Spogli, A. Susnik, CALIBRA Deliverable D6.3: Report on Benefit of Galileo features, January 2015.
  - [10] Aquino, M., J. Park, L. Yang, V. Sreeja, A. Dodson, CALIBRA Deliverable D3.2: Observable & Positioning algorithm V2, December 2014.
  - [11] Susnik, A., M. O'Loughlin, M. Aquino, L. Yang, J. Park, V. Sreeja and A. Dodson, CALIBRA Deliverable D1.3: Characterisation metric, ionospheric estimators and problem characterization V2, July 2014.
  - [12] Monico, J.F.G., P. Camargo, D. B. M. Alves, H. dos R. Silva, V. A. S. Pereira, B. C. Vani, Í. Tsuchiya, J. Park, M. Aquino, S. Veetil, L. Yang, A. Dodson, CALIBRA Deliverable D5.1: Static, Offshore, Dynamic & Surveying Test Report, July 2014.
  - [13] Park, J., L. Yang, M. Aquino, and A. Dodson, CALIBRA Deliverable D3.2: Algorithm development V1, November 2013.
  - [14] Aquino, M., J. Park, A. Susnik, G. De Franceschi, B. Bougard, B. Vani, J. F. G. Monico, and A. Dodson, CALIBRA Deliverable D7.1: Mid-term review report, November 2013
  - [15] Susnik, A., L. Yang, J. Park, M. Aquino and A. Dodson, CALIBRA Deliverable D1.2: Characterisation metric, ionospheric estimators and problem characterization, September 2013.
  - [16] Yang, L., J. Park, M. Aquino, A. Dodson, and V. Sreeja, CALIBRA Deliverable D3.1: Algorithm review, March 2013.

• **Other articles:**

- [1] Huang, C. Y., J. F. Helmboldt, J. Park, T. R. Pedersen, and R. J. Willeman (2019), Measuring explosive events on earth from the ionosphere, *Eos*, 100, <https://doi.org/10.1029/2019EO120143>. Published on 12 April 2019.
- [2] Olsen, M.J., R. J. Schultz, C. Parrish, J. Park, J. Kiser, and Y. Turkan, SaGES 2017: The XIV Surveying and Geomatics Educators Society Conference at Oregon State University, *Surveying and Land Information Science*, Vol. 77, No. 2, 2018, pp. 67-70.
- [3] Park\*, J. and J. Helmboldt (2017), Detection of Large Scale Man-Made Explosions by the Global Navigation Satellite System, *HDIAC Journal*, 4(2):25-29.
- [4] Grejner-Brzezinska, D. A., J. Park, J. Helmboldt, R. R. B. von Frese, T. Wilson, and Y. Morton, GNSS and Radio Astronomical Observations, *GPS World*, August 1, 2013. (<http://gpsworld.com/gnss-and-radio-astronomical-observations/>)
- [5] Park, J., D. A. Grejner-Brzezinska, R. R.B. von Frese (2011), A new way to detect secret nuclear tests: GPS (op-eds), *Bulletin of the Atomic Scientists*, August, 2011, Source URL (retrieved on 08/19/2011 - 09:56): <http://www.thebulletin.org/node/8831>.

- [6] von Frese, R.R.B., J. Park, and D. A. Grejner-Brzezinska, The Ohio State University, Impact of Underground Nuclear Explosions on Ionospheric TEC Observed by GPS, *GPS World* Technical Talk, February 26, 2010.

### **INVITED TECHNICAL TALKS**

- [1] [Invited Talk] GNSS-Reflectometry based Water Level Observation System (GWOS), Joint workshop of Korea Research Institute of Ships & Ocean Engineering (KRISO) and National Maritime PNT Office (NMPO), 20 December 2018, Daejeon, South Korea.
- [2] Park, J., Earth environmental monitoring using Global Navigation Satellite System (GNSS), Korea Astronomy and Space Science Institute, Daejeon, South Korea, 8 August 2017.
- [3] Park, J., “Earth environmental monitoring using Global Navigation Satellite System (GNSS)”, Seoul National University, Seoul, South Korea, 9 August 2017.
- [4] Park, J., “Ionospheric monitoring using GNSS and other applications, Korea Polar Research Institute (KOPRI), Incheon, South Korea, 17 August 2017.
- [5] Park, J., “Earth environmental monitoring using Global Navigation Satellite System (GNSS), Spatial Data Management Group (SDMG) meeting, Corvallis, OR, 20 April 2017.
- [6] Park, J., M. Olsen, C. Parrish, Collaborative research with Oregon State University (OSU) and NOAA/NGS: Towards Optimizing the Determination of Accurate Heights with GNSS, U.S. National Geodetic Survey (NGS), National Oceanic and Atmospheric Administration (NOAA), Silver Spring, MD, 16 March 2017.
- [7] Park, J. and S. Kim, “Coastal flood monitoring using Global Navigation Satellite System (GNSS), KSEA Northwest Regional Conference 2016, 29-30 October 2016, San Jose, CA.
- [8] Park, J., “Coastal flood monitoring using Global Navigation Satellite System (GNSS)”, Industry Advisory Board (IAB) meeting, Corvallis, OR, 14 October 2016.
- [9] Park, J., “Ionospheric detection of geophysical events using GNSS”, National Institute of Meteorological Sciences (NIMS), Seogwipo, South Korea, June 2016.
- [10] Park, J., “GNSS and GNSS-Reflectometry (GNSS-R) for water level monitoring”, Korea Hydrographic and Oceanographic Agency, Busan, South Korea, June 2016.
- [11] Park, J., “Ionospheric monitoring of Underground Nuclear explosions”, The Joint Chiefs of Staff (JCS) of South Korean military, Seoul, South Korea, March 2016.
- [12] Park, J., “Ionospheric effects on GNSS and Topics in Geodesy”, U.S. National Geodetic Survey (NGS), National Oceanic and Atmospheric Administration (NOAA), Silver Spring, MD, March 2016.
- [13] Park, J., “Atmospheric effects on Global Navigation Satellite System (GNSS)”, PLSO2016, Eugene, OR, January 2016.
- [14] Park, J., “GNSS positioning and atmospheric detection”, Korea Astronomy and Space Science Institute (KASI), Daejeon, South Korea, January 2015.



- [15] Park, J. “The impact and mitigation of Ionospheric disturbance on high accurate positioning”, Korea Research Institute of Ships & Ocean Engineering (KRISO), Daejeon, South Korea, January 2015.
- [16] Park, J. “GNSS positioning and remote sensing”, University of Seoul, Seoul, South Korea, July 2013.
- [17] Park, J. “Ionospheric observations of underground nuclear explosions using GPS”, Sao Paul State University (UNESP), Presidente Prudente, SP, Brazil, June 2013.
- [18] von Frese, R. R. B., J. Park, D. A. Grejner-Brzezinska, “GPS detection and monitoring of underground nuclear explosions”, Advances in nuclear test monitoring and verification, American Association for the Advancement of Science (AAAS), Washington, DC, September, 2012.
- [19] Park, J., “Detection of traveling ionospheric disturbances induced by the recent North Korean underground nuclear explosions, Battelle, Columbus, OH, June, 2012.
- [20] Park, J., “Ionospheric effects of underground nuclear explosion”, ION Dayton section, Dayton, OH, October, 2011.
- [21] Park, J., “Ionospheric detection of the recent North Korean underground nuclear explosion”, Korean Institute of Geoscience and Mineral Resources, Daejeon, South Korea, September, 2011.