LECTURE NOTES

on

Landsat Satellite Imagery and Airbus Earth Observation Systems

(UAV Platforms and Satellite Imagery)

Prepared by

Dr. Aran Castro

Post Doctoral Researcher, Earth Sciences

https://draran.online

Target Audience: PhD Scholars and Researchers

April 2026

PART I: LANDSAT SATELLITE IMAGERY

1. Introduction to the Landsat Programme

The Landsat programme, jointly managed by the United States Geological Survey (USGS) and the National Aeronautics and Space Administration (NASA), constitutes the longest continuously operating satellite-based Earth observation programme in history. Since the launch of Landsat 1 on 23 July 1972, the programme has provided an uninterrupted, calibrated record of the Earth's land surface for over five decades (Wulder et al., 2022). This sustained observational record has been instrumental in characterising global environmental change, including deforestation, urbanisation, glacial retreat, and agricultural expansion.

The Landsat data archive, comprising millions of scenes acquired at moderate spatial resolution (30 m), serves as the foundational dataset for numerous earth science disciplines. The adoption of a free and open data policy in 2008 further democratised access to satellite imagery, enabling researchers across developing and developed nations to utilise these data without economic constraints (Woodcock et al., 2008).

2. Historical Evolution of the Landsat Constellation

The Landsat constellation has undergone substantial technological advancement across nine satellite missions spanning 1972 to 2021. Each successive mission incorporated improved sensor technology, enhanced radiometric sensitivity, and broader spectral coverage.

Mission	Launch Date	Sensor(s)	Key Contributions
Landsat 1	23 July 1972	MSS, RBV	First civilian Earth observation satellite; 80 m resolution
Landsat 2	22 January 1975	MSS, RBV	Continuity of MSS data acquisition
Landsat 3	5 March 1978	MSS, RBV	Addition of thermal infrared band (120 m)
Landsat 4	16 July 1982	TM, MSS	Introduction of Thematic Mapper; 30 m resolution
Landsat 5	1 March 1984	TM, MSS	Longest operational satellite (28+ years); backbone of global archive
Landsat 6	5 October 1993	ETM	Launch failure; did not achieve orbit
Landsat 7	15 April 1999	ETM+	Panchromatic band (15 m); SLC failure in 2003
Landsat 8	11 February 2013	OLI, TIRS	Push-broom architecture; 12-bit radiometry; coastal aerosol band
Landsat 9	27 September 2021	OLI-2, TIRS-2	14-bit OLI-2 radiometry; improved SNR; constellation with Landsat 8

The transition from the Multispectral Scanner (MSS) with 80 m spatial resolution to the Thematic Mapper (TM) with 30 m resolution on Landsat 4 (1982) marked a paradigm shift in satellite-based land surface characterisation. The operational longevity of Landsat 5 (1984–2013) provided an unprecedented 28-year baseline for temporal analysis of land use and land cover dynamics (Roy et al., 2014).

3. Technical Specifications: Landsat 8 and Landsat 9

3.1 Orbital Parameters

Parameter	Specification
Orbital Altitude	705 km
Orbital Inclination	98.2° (sun-synchronous)
Orbital Period	99 minutes
Equatorial Crossing Time	10:00 AM (±15 minutes) local time, descending node
Repeat Cycle (single satellite)	16 days
Repeat Cycle (constellation)	8 days (Landsat 8 + 9 combined)
Swath Width	185 km

3.2 Spectral Band Specifications

Landsat 8 carries the Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS), whilst Landsat 9 carries the improved OLI-2 and TIRS-2 instruments. Both satellites maintain identical spectral band configurations to ensure data continuity across the constellation.

Band No.	Band Name	Wavelength (µm)	Spatial Res. (m)	Primary Application
1	Coastal/Aerosol	0.433–0.453	30	Coastal zone mapping; aerosol detection
2	Blue	0.450–0.515	30	Bathymetric mapping; vegetation discrimination
3	Green	0.525–0.600	30	Vegetation vigour assessment; peak reflectance
4	Red	0.630–0.680	30	Chlorophyll absorption; vegetation classification
5	Near-Infrared (NIR)	0.845–0.885	30	Biomass estimation; shoreline delineation
6	SWIR 1	1.560–1.660	30	Soil moisture; vegetation stress detection
7	SWIR 2	2.100–2.300	30	Mineral mapping; geological discrimination
8	Panchromatic	0.500–0.680	15	Image sharpening; feature extraction
9	Cirrus	1.360–1.390	30	Cirrus cloud detection and masking
10	Thermal IR 1	10.60–11.19	100	Land surface temperature; thermal anomaly
11	Thermal IR 2	11.50–12.51	100	Atmospheric correction of thermal data

3.3 Radiometric Resolution

The radiometric resolution represents a critical advancement across Landsat generations. Landsat 8 OLI acquires data at 12-bit quantisation (4,096 grey levels), whilst Landsat 9 OLI-2 operates at 14-bit quantisation (16,384 grey levels). This enhanced radiometric sensitivity on OLI-2 enables improved detection of subtle spectral variations in dark targets such as dense tropical forests, deep water bodies, and shadow regions (Masek et al., 2020). The TIRS and TIRS-2 thermal sensors both operate at 12-bit radiometric resolution.

4. Data Products and Processing Levels

The USGS distributes Landsat data through a structured processing hierarchy, with each level applying successive corrections to enhance data quality and analytical utility.

Processing Level	Description	Key Corrections Applied
Level-1 (L1TP)	Terrain Precision-corrected	Radiometric calibration; geometric correction using GCPs and DEM; UTM projection
Level-2 (L2SP)	Surface Reflectance / Surface Temperature	Atmospheric correction (6S radiative transfer model); cloud, shadow, and water masks; surface temperature retrieval
Analysis Ready Data (ARD)	Tile-based pre-processed archive	Level-2 corrections on standardised tile grid; pixel-level quality assessment; direct input for time-series analysis

Collection 2 represents the current reprocessing standard, incorporating improved geometric accuracy (≤12 m RMSE), updated radiometric calibration coefficients, and enhanced atmospheric correction algorithms applied consistently across the entire Landsat 5–9 archive (Masek et al., 2020).

5. Applications of Landsat Data in Earth Sciences

5.1 Land Use and Land Cover (LULC) Classification

The 30 m spatial resolution and consistent spectral coverage of Landsat data make it the preferred dataset for regional to global LULC classification. Multi-temporal composites, combined with machine learning classifiers such as Random Forest and Support Vector Machines, enable the generation of LULC maps with overall accuracies exceeding 85% for 8–15 class classification schemes (Gong et al., 2013). The multi-decadal archive facilitates change detection analysis, quantifying transitions between forest, agricultural, urban, and barren land cover types across temporal scales of years to decades.

5.2 Vegetation Monitoring

Spectral vegetation indices derived from Landsat bands serve as quantitative proxies for canopy biophysical parameters. The Normalized Difference Vegetation Index (NDVI), computed as (NIR

– Red) / (NIR + Red), i.e., (Band 5 – Band 4) / (Band 5 + Band 4) for Landsat 8/9, provides a measure of vegetation greenness and photosynthetic activity. The Enhanced Vegetation Index (EVI) incorporates the blue band to minimise atmospheric and canopy background effects, yielding improved sensitivity in dense tropical canopies (Huete et al., 2002). The 16-day revisit cycle enables monitoring of phenological dynamics, crop growth stages, and disturbance recovery trajectories.

5.3 Water Resources and Hydrology

Landsat data support water body delineation through the Modified Normalized Difference Water Index (MNDWI), computed as (Green – SWIR1) / (Green + SWIR1). The thermal infrared bands enable estimation of water surface temperature for reservoir thermal stratification analysis and effluent discharge monitoring. Flood extent mapping using the 8-day constellation revisit provides near-real-time spatial information for disaster management and hydrological modelling.

5.4 Geological Mapping and Mineral Exploration

The shortwave infrared (SWIR) bands of Landsat 8/9, particularly bands 6 (1.56–1.66 μm) and 7 (2.10–2.30 μm), capture diagnostic absorption features associated with hydroxyl-bearing minerals, iron oxides, and carbonates. Band ratio techniques (e.g., Band 6/Band 7 for clay mineral detection; Band 4/Band 2 for iron oxide mapping) facilitate identification of hydrothermal alteration zones and lithological boundaries, supporting mineral exploration target delineation (Sabins, 1999).

5.5 Urban Studies and Heat Island Assessment

The combination of multispectral reflectance data with thermal infrared bands enables characterisation of urban heat island (UHI) effects. Land surface temperature (LST) derived from TIRS bands, coupled with impervious surface fraction estimates, provides spatially explicit information on intra-urban thermal variability. The 15 m panchromatic band enables improved spatial discrimination of built-up features through pan-sharpening techniques.

5.6 Climate Change and Cryosphere Studies

The five-decade Landsat archive provides an invaluable record for monitoring cryospheric changes, including glacier recession, ice sheet dynamics, and snow cover extent. Multi-temporal analysis of glacier terminus positions, equilibrium line altitudes, and supraglacial lake expansion contributes directly to assessments of global climate change impacts on water resources and sea-level rise (Bolch et al., 2012).

6. Data Access Platforms

Landsat data are distributed under a free and open data policy, adopted in 2008, which has significantly expanded the user base and research output.

- USGS EarthExplorer (earthexplorer.usgs.gov): Primary web-based interface for scene discovery, metadata inspection, and bulk download of Level-1 and Level-2 Collection 2 products.
- Google Earth Engine (GEE): Cloud-based geospatial analysis platform with pre-loaded Landsat archive; supports JavaScript and Python APIs for scalable continental and global analyses without data download requirements.
- Amazon Web Services (AWS) Open Data Registry: Landsat Collection 2 Level-2 data hosted on cloud infrastructure, enabling integration with scalable compute resources.
- Microsoft Planetary Computer: Cloud-hosted Landsat archive with integrated STAC catalogue and Jupyter-based analytical environment.

PART II: AIRBUS EARTH OBSERVATION SYSTEMS

(UAV Platforms and Satellite Imagery)

7. Introduction to Airbus Defence and Space

Airbus Defence and Space (a division of Airbus SE) is a leading European aerospace and defence corporation with significant capabilities in Earth observation. The division operates both satellite-based and unmanned aerial systems for intelligence, surveillance, and environmental monitoring applications. Through its Airbus Intelligence subsidiary, the corporation provides a vertically integrated portfolio encompassing satellite design, launch, operation, data acquisition, processing, and distribution.

8. Airbus Unmanned Aerial Vehicle (UAV) Platforms

8.1 Zephyr: High Altitude Pseudo-Satellite (HAPS)

The Airbus Zephyr represents a class of solar-electric, stratospheric unmanned aerial systems designed for persistent, long-endurance operation. Designated as a High Altitude Pseudo-Satellite (HAPS), the Zephyr occupies a unique operational niche between conventional UAVs and geostationary satellites, operating in the stratosphere at altitudes of approximately 20–25 km (above commercial aviation and weather systems). The solar-powered propulsion system enables flights of weeks to months duration, far exceeding the endurance capabilities of conventional battery- or fuel-powered UAVs (Airbus Defence and Space, 2023).

Parameter	Zephyr S	Zephyr T
Wingspan	25 m	33 m
Mass (MTOW)	75 kg	140 kg
Operational Altitude	~20,000 m (65,600 ft)	~20,000 m (65,600 ft)
Endurance	>26 days (world record: 64 days in 2022)	Up to 45+ days (design target)
Payload Capacity	5 kg	20 kg
Propulsion	Solar-electric (Si photovoltaic + Li-S batteries)	Solar-electric (advanced arrays)
Primary Sensor Types	EO/IR cameras, LIDAR, communications relay	EO/IR, SAR, communications, ISR payloads

8.1.1 Applications of Zephyr HAPS

The persistent, wide-area coverage capability of Zephyr systems offers applications in disaster monitoring (forest fire tracking, flood surveillance), border and maritime surveillance, precision agriculture monitoring, environmental change detection over inaccessible terrain, and telecommunications relay for rural connectivity. The stratospheric operational altitude provides coverage areas comparable to low-Earth orbit satellites but with significantly higher revisit frequency and spatial resolution owing to the reduced altitude (Gonzalo et al., 2018).

8.2 VSR700: Rotary-Wing UAV

The VSR700, developed by Airbus Helicopters in partnership with the French Navy, is a rotary-wing tactical UAV based on the civil-certified Cabri G2 helicopter platform. Designed primarily for naval operations, the VSR700 provides shipborne intelligence, surveillance, and reconnaissance (ISR) capabilities.

Parameter	Specification
Maximum Take-Off Weight (MTOW)	760 kg
Maximum Payload	150–250 kg
Endurance	~10 hours
Service Ceiling	~6,000 m (20,000 ft)
Maximum Speed	~185 km/h
Propulsion	Diesel piston engine
Launch/Recovery	Autonomous ship-based (DeckFinder system)

The VSR700 is designed for autonomous launch and recovery from naval vessels using the DeckFinder precision positioning system, enabling operation from frigates and other surface combatants without runway infrastructure. Sensor payloads include electro-optical/infrared (EO/IR) turrets, maritime surveillance radar, and AIS receivers for vessel identification.

8.3 Eurodrone (MALE RPAS)

The Eurodrone, formally designated as the Medium Altitude Long Endurance Remotely Piloted Aircraft System (MALE RPAS), is a multinational European programme led by Airbus Defence and Space in partnership with Dassault Aviation and Leonardo. This twin-turboprop platform is intended to provide European nations with a sovereign ISR and SIGINT capability, independent of non-European systems.

Parameter	Specification
Wingspan	~26 m
Maximum Take-Off Weight (MTOW)	~11,000 kg
Payload Capacity	2,300 kg (internal + external)
Endurance	>24 hours
Service Ceiling	~13,700 m (45,000 ft)
Propulsion	Twin turboprop engines
Certification	STANAG 4671 military airworthiness; European civil airspace compatibility

The Eurodrone programme addresses the strategic requirement for a European-developed MALE UAV system capable of operating in both segregated and non-segregated airspace. Applications encompass wide-area surveillance, signals intelligence, maritime patrol, and environmental monitoring over extended operational areas.

9. Airbus Satellite Imagery Systems

Airbus Defence and Space operates and distributes data from multiple very high resolution (VHR) and high resolution (HR) optical satellite constellations. These systems, developed in collaboration with the Centre National d'Études Spatiales (CNES), constitute the primary European commercial VHR satellite capability.

9.1 Pléiades 1A and 1B

The Pléiades constellation comprises twin agile satellites (Pléiades 1A launched 17 December 2011; Pléiades 1B launched 2 December 2012) operating in a sun-synchronous orbit at 694 km altitude. Phased 180° apart in the same orbital plane, the constellation provides daily revisit capability for any point on the Earth's surface (Gleyzes et al., 2012).

Parameter	Specification
Orbital Altitude	694 km (sun-synchronous)
Panchromatic Resolution	0.50 m (nadir)
Multispectral Resolution	2.0 m (nadir)
Spectral Bands	Pan: 0.47–0.83 µm; Blue: 0.43–0.55 µm; Green: 0.50–0.62 µm; Red: 0.59–0.71 µm; NIR: 0.74–0.94 µm
Swath Width	20 km (nadir)
Revisit Time	Daily (constellation); same-orbit stereo and tri-stereo acquisition
Radiometric Resolution	12-bit
Geolocation Accuracy	3 m CE90 (without GCPs)

The high agility of the Pléiades satellites (capable of acquiring up to 600 images per day with roll, pitch, and yaw manoeuvrability up to ±47°) enables same-pass stereo and tri-stereo acquisition for digital surface model (DSM) generation at sub-metre vertical accuracy. Applications include urban 3D modelling, infrastructure monitoring, precision agriculture, and post-disaster damage assessment (Perko et al., 2014).

9.2 Pléiades Neo

Pléiades Neo represents the next generation of Airbus very high resolution satellites, comprising four spacecraft (Pléiades Neo 3 launched 29 April 2021; Pléiades Neo 4 launched 17 August 2021; Pléiades Neo 5 and 6 planned). The constellation offers significant improvements in spatial resolution, spectral coverage, and acquisition capacity over the original Pléiades system.

Parameter	Specification
Orbital Altitude	620 km (sun-synchronous)
Panchromatic Resolution	0.30 m (nadir)
Multispectral Resolution	1.2 m (nadir)
Number of Spectral Bands	6 (Pan + Blue + Green + Red + Red Edge + NIR)

Spectral Bands	Pan: 0.45–0.80 µm; Blue: 0.45–0.52 µm; Green: 0.53–0.60 µm; Red: 0.62–0.69 µm; Red Edge: 0.69–0.71 µm; NIR: 0.77–0.89 µm
Swath Width	14 km (nadir)
Revisit Time	Daily (with 4 satellites); multiple daily revisits possible
Radiometric Resolution	12-bit
Daily Acquisition Capacity	Up to 2 million km² per satellite
Geolocation Accuracy	<3.5 m CE90 (without GCPs)

The inclusion of the Red Edge band (0.69–0.71 µm) in Pléiades Neo constitutes a significant advancement for vegetation analysis, enabling improved discrimination of plant species composition, chlorophyll content estimation, and crop stress detection. The 0.30 m native panchromatic resolution provides the highest commercially available optical satellite resolution in Europe, enabling identification of individual trees, vehicles, and structural elements of buildings (Airbus Defence and Space, 2022).

9.3 SPOT 6 and SPOT 7

The SPOT (Système Pour l'Observation de la Terre) programme, originated by CNES in 1986, continues with SPOT 6 (launched 9 September 2012) and SPOT 7 (launched 30 June 2014) under Airbus Defence and Space operation. These satellites provide high-resolution wide-swath coverage complementary to the Pléiades constellation.

Parameter	Specification
Orbital Altitude	694 km (sun-synchronous)
Panchromatic Resolution	1.5 m (nadir)
Multispectral Resolution	6.0 m (nadir)
Spectral Bands	Pan: 0.45–0.75 µm; Blue: 0.45–0.52 µm; Green: 0.53–0.59 µm; Red: 0.62–0.69 µm; NIR: 0.76–0.89 µm
Swath Width	60 km (nadir)
Revisit Time	Daily (constellation with Pléiades)
Radiometric Resolution	12-bit
Coverage Capacity	6 million km²/day

The 60 km swath width of SPOT 6/7 provides substantially greater area coverage per pass compared to Pléiades (20 km) and Pléiades Neo (14 km), making these satellites particularly suitable for regional-scale mapping, agricultural monitoring over large tracts, and national mapping programmes. When tasked in constellation mode with Pléiades, the combined system offers a multi-resolution observation capability from 0.30 m to 6.0 m spatial resolution (Astrium, 2013).

10. Comparative Analysis: Landsat vs. Airbus Systems

A comparative evaluation of the Landsat and Airbus Earth observation systems reveals complementary strengths suited to distinct research and operational requirements.

Parameter	Landsat 8/9	Pléiades Neo	SPOT 6/7	Zephyr HAPS
Spatial Resolution	15–100 m	0.30–1.2 m	1.5–6.0 m	Variable (altitude dependent)
Spectral Bands	11	6	5	Payload dependent
Swath Width	185 km	14 km	60 km	Variable
Revisit Time	8 days (pair)	Daily	Daily	Persistent (continuous)
Data Cost	Free and open	Commercial	Commercial	Operational cost
Coverage Scale	Global	Targeted	Regional	Local–Regional
Primary Use Case	Long-term monitoring	Detailed mapping	Regional surveys	Persistent surveillance

The selection of an appropriate Earth observation platform depends on the spatial resolution requirements, temporal revisit needs, spectral specifications, coverage extent, and budgetary constraints of the specific research application. Landsat provides unmatched temporal depth and free global coverage at moderate resolution, whilst Airbus VHR satellites offer sub-metre detail for targeted studies. The Zephyr HAPS fills a niche for persistent, wide-area monitoring at resolutions intermediate between satellites and conventional UAVs.

11. Applications of Airbus Systems in Earth Sciences

11.1 Urban Mapping and Infrastructure Monitoring

The sub-metre resolution of Pléiades and Pléiades Neo enables detection and characterisation of individual buildings, road networks, and critical infrastructure. Stereo and tri-stereo image pairs support generation of 3D city models with vertical accuracy of 1–2 m, facilitating urban planning, informal settlement mapping, and post-seismic structural damage assessment (Gleyzes et al., 2012).

11.2 Precision Agriculture

The Red Edge band on Pléiades Neo, combined with the 1.2 m multispectral resolution, supports individual crop row delineation, within-field variability assessment, and early stress detection. These capabilities, when integrated with UAV-derived data from platforms such as the Zephyr for persistent monitoring, enable site-specific management recommendations at agronomic decision-making scales.

11.3 Disaster Response and Emergency Mapping

The high agility and rapid tasking capability of Pléiades and SPOT satellites (with tasking-to-delivery timelines of less than 24 hours) make these systems critical assets in the International

Charter on Space and Major Disasters. Post-event imagery at sub-metre resolution enables detailed damage assessment, identification of blocked transportation routes, and estimation of affected population in the immediate aftermath of natural disasters and humanitarian crises.

11.4 Environmental and Coastal Monitoring

SPOT 6/7 wide-swath coverage supports regional-scale environmental monitoring applications including coastal erosion assessment, wetland delineation, mangrove mapping, and coral reef health evaluation. The 6 m multispectral resolution provides sufficient detail for habitat classification while maintaining coverage extent appropriate for ecosystem-level analysis.

12. Airbus Data Access and Intelligence Products

Airbus Intelligence (formerly Airbus Defence and Space Intelligence) serves as the commercial distribution entity for Airbus Earth observation data. Key access channels include:

- OneAtlas Platform: Cloud-based portal providing access to Airbus satellite imagery archive, living atlas (continuously updated basemap), and analytical services through streaming and download APIs.
- Geostore: Catalogue and ordering system for archive and new tasking imagery products from Pléiades, Pléiades Neo, SPOT, and TerraSAR-X/TanDEM-X radar satellites.
- Processing Levels: Primary (sensor-corrected), Standard Ortho (map-projected with DEM correction), and Premium products (pan-sharpened, atmospherically corrected).

References

Airbus Defence and Space (2022). Pléiades Neo: The New Reference in Optical Very High Resolution. Product Brochure. Toulouse: Airbus Defence and Space.

Airbus Defence and Space (2023). Zephyr: High Altitude Pseudo-Satellite. Technical Documentation. Toulouse: Airbus Defence and Space.

Astrium (2013). SPOT 6/7 Imagery – User Guide. Paris: Astrium Services.

Bolch, T., Kulkarni, A., Kääb, A., Huggel, C., Paul, F., Cogley, J.G., Frey, H., Kargel, J.S., Fujita, K., Scheel, M., Bajracharya, S. and Stoffel, M. (2012). 'The state and fate of Himalayan glaciers', Science, 336(6079), pp. 310–314. doi:10.1126/science.1215828.

Gleyzes, M.A., Perret, L. and Kubik, P. (2012). 'Pléiades system architecture and main performances', International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XXXIX-B1, pp. 537–542. doi:10.5194/isprsarchives-XXXIX-B1-537-2012.

Gong, P., Wang, J., Yu, L., Zhao, Y., Zhao, Y., Liang, L., Niu, Z., Huang, X., Fu, H., Liu, S., Li, C., Li, X., Fu, W., Liu, C., Xu, Y., Wang, X., Cheng, Q., Hu, L., Yao, W., Zhang, H., Zhu, P., Zhao, Z., Zhang, H., Zheng, Y., Ji, L., Zhang, Y., Chen, H., Yan, A., Guo, J., Yu, L., Wang, L., Liu, X., Shi, T., Zhu, M., Chen, Y., Yang, G., Tang, P., Xu, B., Giri, C., Clinton, N., Zhu, Z., Chen, J. and Chen, J. (2013). 'Finer resolution observation and monitoring of global land cover: First mapping results with Landsat TM and ETM+ data', International Journal of Remote Sensing, 34(7), pp. 2607–2654. doi:10.1080/01431161.2012.748992.

Gonzalo, J., López, D., Domínguez, D., García, A. and Escapa, A. (2018). 'On the capabilities and limitations of high altitude pseudo-satellites', Progress in Aerospace Sciences, 98, pp. 37–56. doi:10.1016/j.paerosci.2018.03.006.

Huete, A., Didan, K., Miura, T., Rodriguez, E.P., Gao, X. and Ferreira, L.G. (2002). 'Overview of the radiometric and biophysical performance of the MODIS vegetation indices', Remote Sensing of Environment, 83(1–2), pp. 195–213. doi:10.1016/S0034-4257(02)00096-2.

Masek, J.G., Wulder, M.A., Markham, B., McCorkel, J., Crawford, C.J., Storey, J. and Jenstrom, D.T. (2020). 'Landsat 9: Empowering open science and applications through continuity', Remote Sensing of Environment, 248, p. 111968. doi:10.1016/j.rse.2020.111968.

Perko, R., Raggam, H., Gutjahr, K. and Schardt, M. (2014). 'Assessment of the mapping potential of Pléiades stereo and triplet data', ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, II-3, pp. 103–109. doi:10.5194/isprsannals-II-3-103-2014.

Roy, D.P., Wulder, M.A., Loveland, T.R., Woodcock, C.E., Allen, R.G., Anderson, M.C., Helder, D., Irons, J.R., Johnson, D.M., Kennedy, R., Scambos, T.A., Schaaf, C.B., Schott, J.R., Sheng, Y., Vermote, E.F., Belward, A.S., Bindschadler, R., Cohen, W.B., Gao, F., Hipple, J.D., Hostert, P., Huntington, J., Justice, C.O., Kilic, A., Kovalskyy, V., Lee, Z.P., Lymburner, L., Masek, J.G., McCorkel, J., Shuai, Y., Trezza, R., Vogelmann, J., Wynne, R.H. and Zhu, Z. (2014). 'Landsat-8: Science and product vision for terrestrial global change research', Remote Sensing of Environment, 145, pp. 154–172. doi:10.1016/j.rse.2014.02.001.

Sabins, F.F. (1999). ‘Remote sensing for mineral exploration’, Ore Geology Reviews, 14(3–4), pp. 157–183. doi:10.1016/S0169-1368(99)00007-4.

Woodcock, C.E., Allen, R., Anderson, M., Belward, A., Bindschadler, R., Cohen, W., Gao, F., Goward, S.N., Helder, D., Helmer, E., Nemani, R., Oreopoulos, L., Schott, J., Thenkabail, P.S., Vermote, E.F., Vogelmann, J., Wulder, M.A. and Wynne, R. (2008). ‘Free access to Landsat imagery’, Science, 320(5879), p. 1011. doi:10.1126/science.320.5879.1011a.

Wulder, M.A., Roy, D.P., Radeloff, V.C., Loveland, T.R., Anderson, M.C., Johnson, D.M., Healey, S., Zhu, Z., Scambos, T.A., Pahlevan, N., Hansen, M., Gorelick, N., Crawford, C.J., Masek, J.G., Hermosilla, T., White, J.C., Belward, A.S., Schaaf, C., Woodcock, C.E., Huntington, J.L., Lymburner, L., Hostert, P., Gao, F., Lyapustin, A., Pekel, J.-F., Strobl, P. and Cook, B.D. (2022). ‘Fifty years of Landsat science and impacts’, Remote Sensing of Environment, 280, p. 113195. doi:10.1016/j.rse.2022.113195.