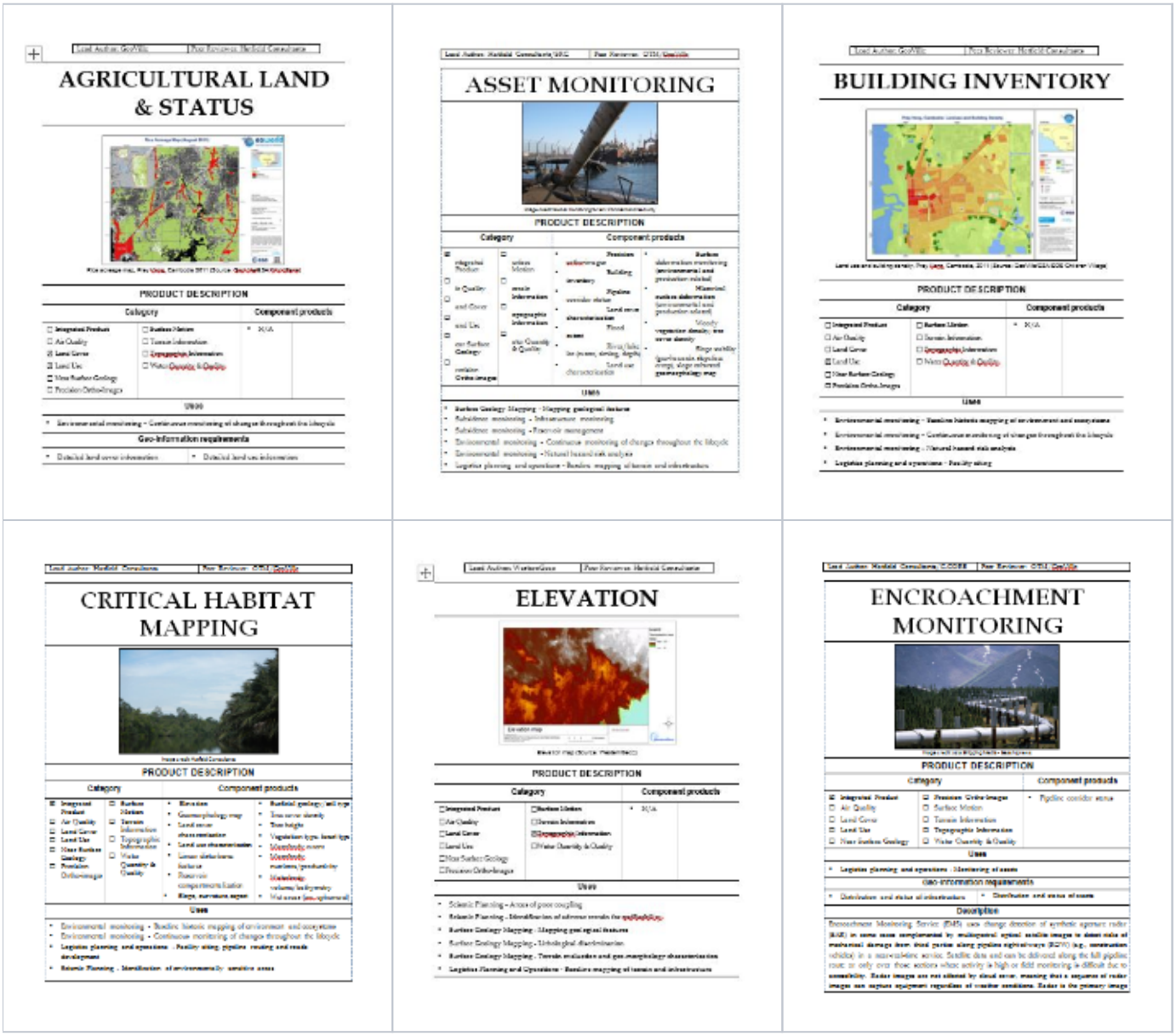
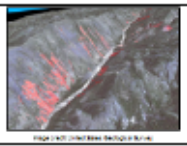
EO4OG Products On-shore

EO4OG Product Sheets On-Shore



FAULTS AND DISCONTINUITIES



PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product ☑ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology	☐ Precision Ortho-Images ☑ Surface Motion ☑ Terrain Information ☑ Topographic Information ☐ Water Quantity & Quality	N/A

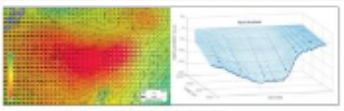
Uses

- Surface geology mapping - mapping geological features
- Surface geology mapping - structural interpretation
- Surface geology mapping - terrain evaluation and geomorphology characterisation
- Subsidence monitoring - Land motion relating to fault lines or other causes
- Surface geology mapping - engineering geological evaluation
- Legislative planning and operations - facility siting, pipeline routing and roads development

Geo-information requirements

- Terrain information
- Topographic information
- Lithology, geological and structural properties of the near surface

FAULT IDENTIFICATION AND REACTIVATION



PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Images	☑ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

Uses

- Subsidence monitoring - Land motion relating to fault lines or other causes
- Surface Geology Mapping - Structural interpretation

Geo-information requirements

- Terrain information
- Surface and ground motion

Description

Faults, both natural and man-induced through reservoir depletion, can be identified and quantified by interpreting surface movement above a producing reservoir. Maps of surface

FLOOD EXTENT



PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product ☐ Air Quality ☑ Land Cover ☑ Land Use ☐ Near Surface Geology	☐ Precision Ortho-Images ☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

Uses

- Environmental monitoring - Natural hazard risk analysis

Geo-information requirements

- Water quantity identification
- Terrain information
- Detailed land cover information
- Distribution and status of infrastructure
- Distribution and status of assets

Description

Flood extent products can be delivered from the project known scale to the regional scale. A combination of radar and optical data for flood mapping is usually implemented, as complementary information can improve the overall products.

Radar-based products

Radar images are not affected by cloud cover, meaning that a sequence of radar images can capture flood event progression regardless of weather conditions. Flood event products derive

FOREST FIRE & RISK MAPPING



PRODUCT DESCRIPTION

Category		Component products	
☑ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• Forest type • Slope • Elevation • Curvature • Urban & settlement map • Land cover map	• Land use map • Vegetation map • NDVI • Precipitation • Progress exploration and monitoring • Temperature

GEOMORPHOLOGY MAP



PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product ☐ Air Quality ☑ Land Cover ☐ Land Use ☐ Near Surface Geology	☐ Precision Ortho-Images ☐ Surface Motion ☑ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

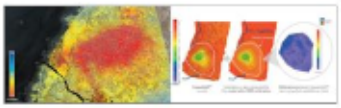
Uses

- Botanic planning - areas of poor coupling
- Botanic planning - identification of adverse terrain for walkability
- Surface geology mapping - mapping geological features
- Surface geology mapping - structural interpretation
- Surface geology mapping - lithological discrimination
- Surface geology mapping - terrain evaluation and geomorphology characterisation
- Surface geology mapping - engineering geological evaluation
- Environmental monitoring - Inundation historic mapping of environment and ecosystems
- Environmental monitoring - natural hazard risk analysis
- Legislative planning and operations - facility siting, pipeline routing and roads development
- Legislative planning and operations - monitoring of assets

Geo-information requirements

- Terrain information
- Topographic information
- Detailed land cover information
- Lithology, geological and structural

HISTORICAL SURFACE DEFORMATION



PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Images	☑ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

Uses

- Subsidence monitoring - Land motion relating to fault lines or other causes
- Subsidence monitoring - Reservoir management
- Subsidence monitoring - Infrastructure monitoring
- Surface Geology Mapping - Structural interpretation
- Legislative planning and operations - Facility siting, pipeline routing and roads development

INFRASTRUCTURE PLANNING & MONITORING



PRODUCT DESCRIPTION

Category		Component products	
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☑ Land Use ☐ Near Surface Geology ☐ Precision	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• Land cover and land use characterisation • Equipment mapping and status • Building inventory • Pipeline corridor status	• Urban area/settlement map • Soil sealing • Transport network • Business and historic subsidence

LAND COVER & LAND COVER CHANGE CHARACTERISATION



PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product ☐ Air Quality ☑ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

Uses

- Environmental monitoring - Baseline historic mapping of environment and ecosystems
- Environmental monitoring - Continuous monitoring of changes throughout the lifecycle

LAND USE & LAND USE CHANGE CHARACTERISATION



PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product ☐ Air Quality	☐ Surface Motion ☐ Terrain Information	N/A

MAPPING AND PREDICTION OF NEAR SURFACE FEATURES



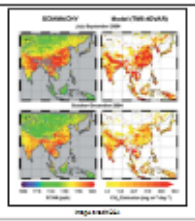
PRODUCT DESCRIPTION

Category	Component products
☒ Integrated Product ☐ Air Quality ☐ Land Cover ☒ Land Use ☒ Near Surface Geology ☐ Precision Ortho-Image	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• Land cover characterization • 10mm scan/ centimeter map • Surficial geology/ soil type	• Elevation • Slope, curvature, aspect • Bath ground map • Terrain roughness

Uses

- Surface geology mapping - mapping geological features
- Surface geology mapping - Lithological discrimination
- Surface geology mapping - Engineering geological evaluation
- Subsidence monitoring - Land motion relating to fault lines or other causes
- Subsidence monitoring - Areas of poor coupling

METHANE EMISSION MONITORING



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☒ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology	☐ Precision Ortho-Image ☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

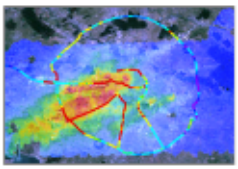
Uses

- Environmental monitoring - baseline historic mapping of environment and ecosystems
- Environmental monitoring - continuous monitoring of changes throughout the lifecycle

Geo-information requirements

• Air quality and emissions	• Detailed land cover information

NO_2 & SO_2



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☒ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Image	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

Uses

- Environmental monitoring - Continuous monitoring of changes throughout the lifecycle

Geo-information requirements

- Air quality and emissions

PERMAFROST ZONE STABILITY/ FROST HEAVING/ DISCONTINUOUS PERMAFROST



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology	☐ Precision Ortho-Image ☒ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

Uses

- Seismic planning - areas of poor coupling
- Surface geology mapping - engineering geological evaluation

PIPELINE CORRIDOR STATUS



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☒ Land Cover ☒ Land Use ☒ Near Surface Geology	☐ Precision Ortho-Image ☐ Surface Motion ☒ Terrain Information ☐ Topographic Information ☒ Water Quantity & Quality	N/A

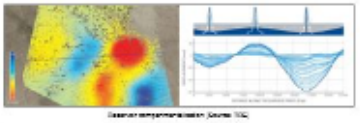
Uses

- Surface geology mapping - terrain evaluation and geomorphology characterization
- Environmental monitoring - baseline historic mapping of environment and ecosystems
- Environmental monitoring - continuous monitoring of changes throughout the lifecycle
- Logistics planning and operations - facility siting, pipeline routing and route development

Geo-information requirements

• Detailed land cover information	• Distribution and status of infrastructure
• Detailed land use information	• Surface and ground motion
• Water quantity identification	

RESERVOIR COMPARTMENTALISATION



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Image	☒ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

Uses

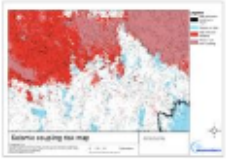
- Subsidence monitoring - Land motion relating to fault lines or other causes
- Subsidence monitoring - Reservoir compartment

Geo-information requirements

• Terrain information	• Surface and ground motion

Description

SEISMIC COUPLING RISK MAP



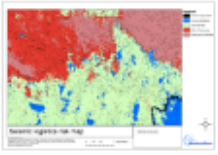
PRODUCT DESCRIPTION

Category	Component products
☒ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• Lithology features • Geomorphology map • Slope stability (geohazards, slope face assay), slope enhanced geomorphology map	• Bath ground • Terrain roughness • Slope, curvature, aspect

Uses

- Seismic Planning - Areas of poor coupling

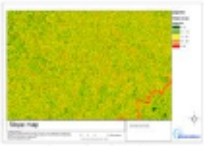
SEISMIC LOGISTICS OPERATION MAP & BASE CAMP MAPPING



PRODUCT DESCRIPTION

Category	Component products
☒ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• Vegetation type, forest type • Hydrological networks & catchments, base critical areas • Site areas (and ephemeral) • Camp maps • Oil field infrastructure	• Linear classed, disturbed land • Lithology features • Geomorphology map • Slope stability (geohazards, slope face assay), slope enhanced geomorphology

SLOPE, CURVATURE, ASPECT



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Precision Ortho-Images	☐ Surface Motion ☐ Terrain Information ☒ Topographic Information ☐ Water Quantity & Quality	• N/A

Uses

- Seismic Planning - Areas of poor coupling
- Subsidence Planning - Identification of sub-crop terrain for amplification
- Surface Geology Mapping - Mapping geological features
- Surface Geology Mapping - Lithological discrimination
- Surface Geology Mapping - Terrain evaluation and geomorphology characterization

SOIL SEALING



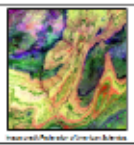
PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☒ Land Use ☐ Near Surface Geology ☐ Premium Ortho Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

Uses

- Environmental monitoring – Baseline historic mapping of environment and ecosystems
- Environmental monitoring – Continuous monitoring of changes throughout the lifecycle
- Logistic planning and operations – Baseline mapping of terrain and infrastructure
- Logistic planning and operations – Facility siting, pipeline routing and roads development
- Logistic planning and operations – Monitoring of assets

STRUCTURAL GEOLOGY



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☒ Near Surface Geology	☐ Premium Ortho Images ☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	N/A

Uses

- Surface geology mapping – mapping geological features
- Surface geology mapping – structural interpretation
- Surface geology mapping – terrain evaluation and geo-morphology characterization
- Environmental monitoring – baseline historic mapping of environment and ecosystems
- Environmental monitoring – natural hazard risk analysis

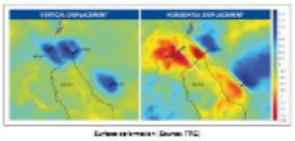
Geo-information requirements

- Terrain information
- Topographic information
- Lithology, geological and structural properties of the near surface

Description

Information on structural geology can be identified from a wide range of EO sensors and tools. DEM analysis is frequently the key method to identify and map structural geological features on the surface/near-surface. DEM analysis complemented by analysis of optical and

SURFACE DEFORMATION MONITORING (ENVIRONMENTAL AND PRODUCTION RELATED)



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Premium Ortho Images	☒ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

TRANSPORT NETWORK & ROAD STATUS



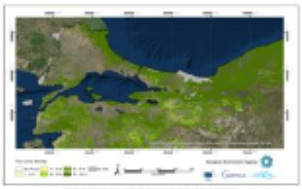
PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☐ Land Cover ☒ Land Use ☐ Near Surface Geology ☐ Premium Ortho Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

Uses

- Environmental monitoring – Baseline historic mapping of environment and ecosystems
- Environmental monitoring – Continuous monitoring of changes throughout the lifecycle
- Logistic planning and operations – Facility siting, pipeline routing and roads development
- Logistic planning and operations – Baseline mapping of terrain and infrastructure
- Logistic planning and operations – Monitoring of assets

TREE COVER DENSITY



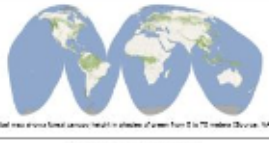
PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☒ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Premium Ortho Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

Uses

- Botanic Planning – Identification of adverse terrain for application.
- Environmental monitoring – Baseline historic mapping of environment and ecosystems
- Environmental monitoring – Continuous monitoring of changes throughout the lifecycle
- Environmental monitoring – Natural hazard risk analysis

TREE HEIGHT



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☒ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Premium Ortho Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

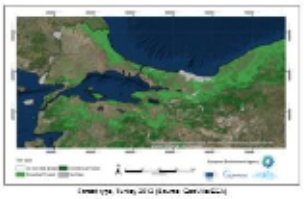
Uses

- Botanic Planning – Identification of adverse terrain for application.
- Environmental monitoring – Baseline historic mapping of environment and ecosystems
- Environmental monitoring – Continuous monitoring of changes throughout the lifecycle
- Environmental monitoring – Natural hazard risk analysis

Geo-information requirements

- Detailed land cover information
- Topographic information (optional, although this is the DTM method)

VEGETATION/FOREST TYPE



PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☒ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Premium Ortho Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A

Uses

- Botanic Planning – Identification of adverse terrain for application.
- Environmental monitoring – Baseline historic mapping of environment and ecosystems

VEGETATION STRESS AND DEGRADATION



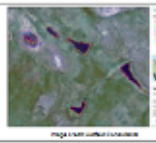
PRODUCT DESCRIPTION

Category	Component products
☐ Integrated Product ☐ Air Quality ☒ Land Cover ☐ Land Use ☐ Near Surface Geology ☐ Premium Ortho Images	☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☐ Water Quantity & Quality	• N/A • LAI • Rainfall information

Uses

- Environmental monitoring – Baseline historic mapping of environment and ecosystems
- Environmental monitoring – Continuous monitoring of changes throughout the lifecycle

WATER BODY EXTENT



PRODUCT DESCRIPTION

Category	Component products
☒ Integrated Product ☐ Air Quality ☐ Land Cover ☐ Land Use ☐ Near Surface Geology	☐ Premium Ortho Images ☐ Surface Motion ☐ Terrain Information ☐ Topographic Information ☒ Water Quantity & Quality	N/A

Uses

- Environmental monitoring – continuous monitoring of changes throughout the lifecycle
- Environmental monitoring – natural hazard risk analysis
- Logistic planning and operations – facility siting, pipeline routing and roads development

Geo-information requirements

- Water quantity identification
- Detailed land cover information

Description

Mapping of permanent and ephemeral water bodies is needed to manage environmental impacts for exploration and development and reduce development impacts on aquatic habitats. Typically, rule calculator will be applied to water bodies for seismic survey and to avoid impacts to water bodies from development. Monitoring impacts on water levels and recharge rate of water bodies following water use is a regulatory requirement in some countries.

Lead Author: Hatfield Consultants MHC | Peer Reviewer: CTO/CanWEA

WATERBODY VOLUME/BATHYMETRY

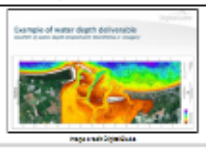


Image credit Hatfield Consultants

PRODUCT DESCRIPTION

category		component products
☐ Integrated Product	☐ Precision Orthoimagery	N/A
☐ Air Quality	☐ Surface Motion	
☐ Land Cover	☐ Terrain Information	
☐ Land Use	☐ Topographic Information	
☐ Near Surface Geology	☑ Water Quantity & Quality	

Uses

- Environmental monitoring - baseline historic mapping of environment and ecosystems
- **Environmental monitoring - continuous monitoring of changes throughout the lifecycle**
- **Environmental monitoring - natural hazard risk analysis**
- Surface geology mapping - mapping geological features

Geo-information requirements

- Water quantity identification
- **Topographic information**
- Terrain information

Description

This product is focused on satellite-derived bathymetry for lakes or shallow coastal areas.

Lead Author: MHC/BRC | Peer Reviewer: CTO/CanWEA

WET AREAS

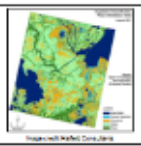


Image credit Hatfield Consultants

PRODUCT DESCRIPTION

Category		Component products
☐ Integrated Product	☐ Precision Orthoimagery	N/A
☐ Air Quality	☐ Surface Motion	
☑ Land Cover	☐ Terrain Information	
☐ Land Use	☐ Topographic Information	
☐ Near Surface Geology	☐ Water Quantity & Quality	

Uses

- Surface Geology Mapping - Terrain evaluation and geomorphology: **characterization**
- **Seismic Planning - identification of adverse terrain for mobilization**
- Seismic Planning - Areas of poor coupling
- Subsidence monitoring - Infrastructure monitoring
- **Environmental monitoring - Baseline historic mapping of environment and ecosystems**
- Environmental monitoring - Continuous monitoring of changes throughout the lifecycle
- Environmental monitoring - Natural Hazard Risk Analysis
- **Logistics planning and operations - Facility siting, pipeline routing and roads development**
- Logistics planning and operations - Support to surveying crews for planning surveys and R&D