

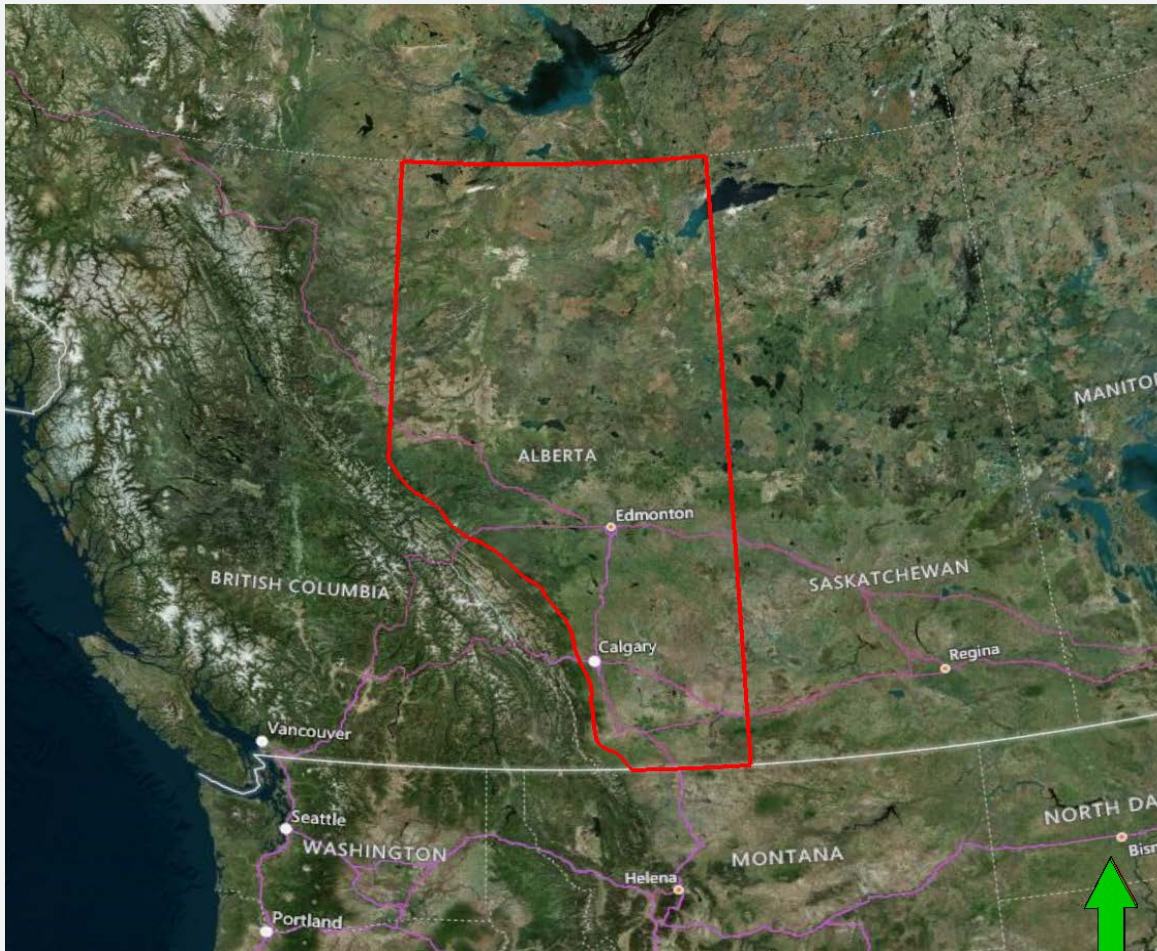


Geological Mapping and Modelling at the Alberta Geological Survey

Kelsey MacCormack

June 15th, 2018

Alberta, Canada



- 661,000 km²
- Characterizing surface and subsurface geology
- Geological Framework Program

Surface and Shallow Subsurface

Resource potential

- Metallic, non-metallic and industrial minerals, baseline environmental geochemistry

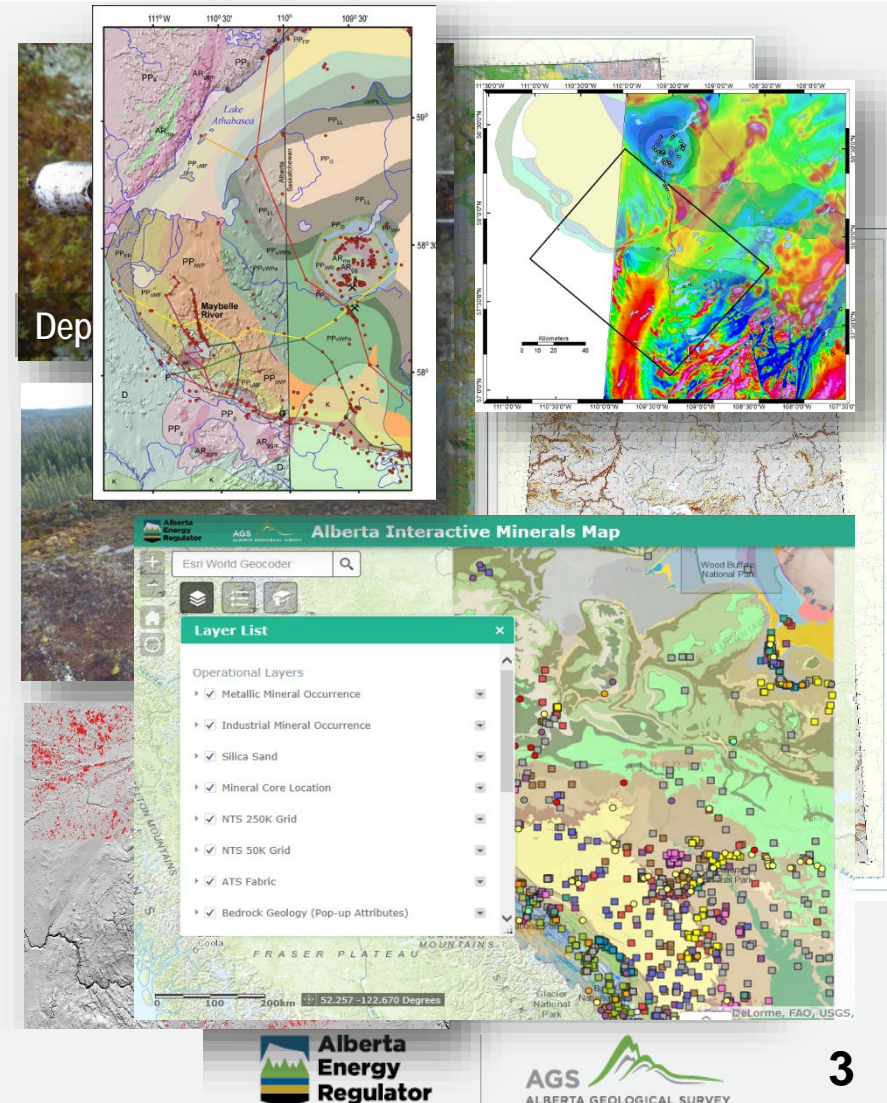
Landscape and Surficial Material characterization

- The geologic interval where resources development and societal interests meet
- Nature and distribution of surficial materials for land use planning

Geohazard mapping

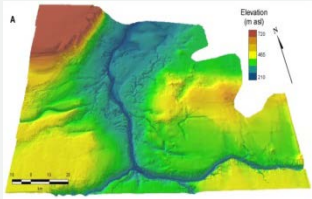
- Landslide characterization, permafrost distribution

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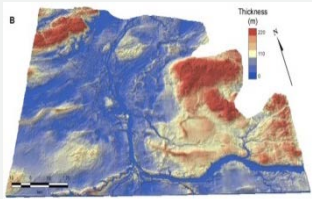


Modelling and Machine Learning Approaches

Surficial Geological Modelling



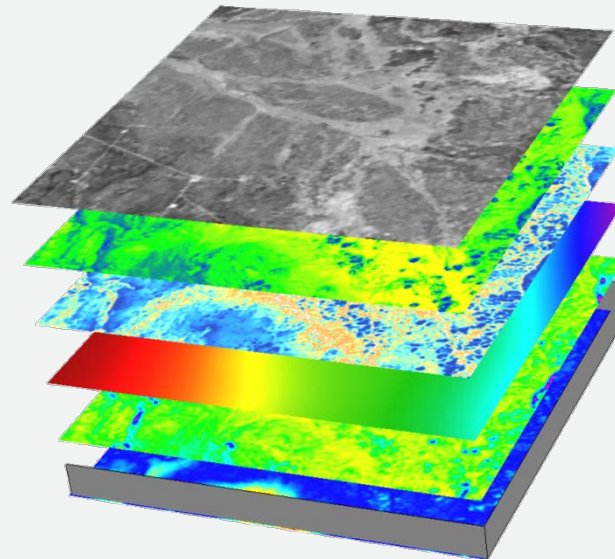
Bedrock topography



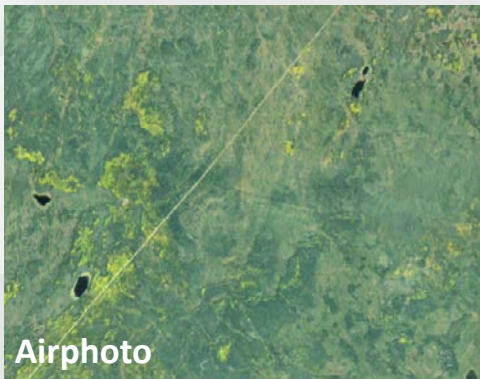
Sediment isopach

Machine Learning

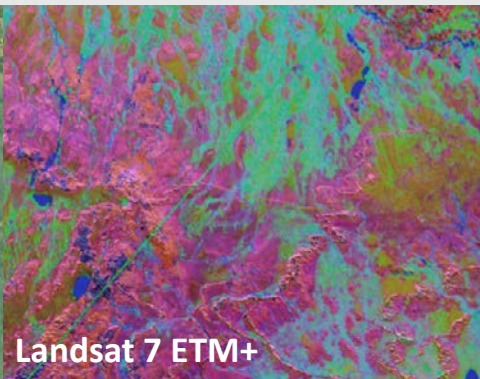
Spectral/Topographic/Climatic Predictors



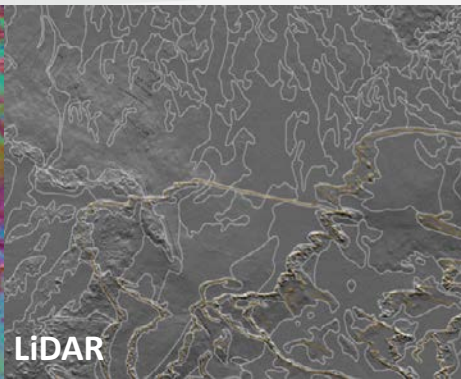
Spectral data
Relative height/slope
Topographic openness
Temperature/precipitation/
snow acc.
Ruggedness
Surface wetness



Airphoto



Landsat 7 ETM+



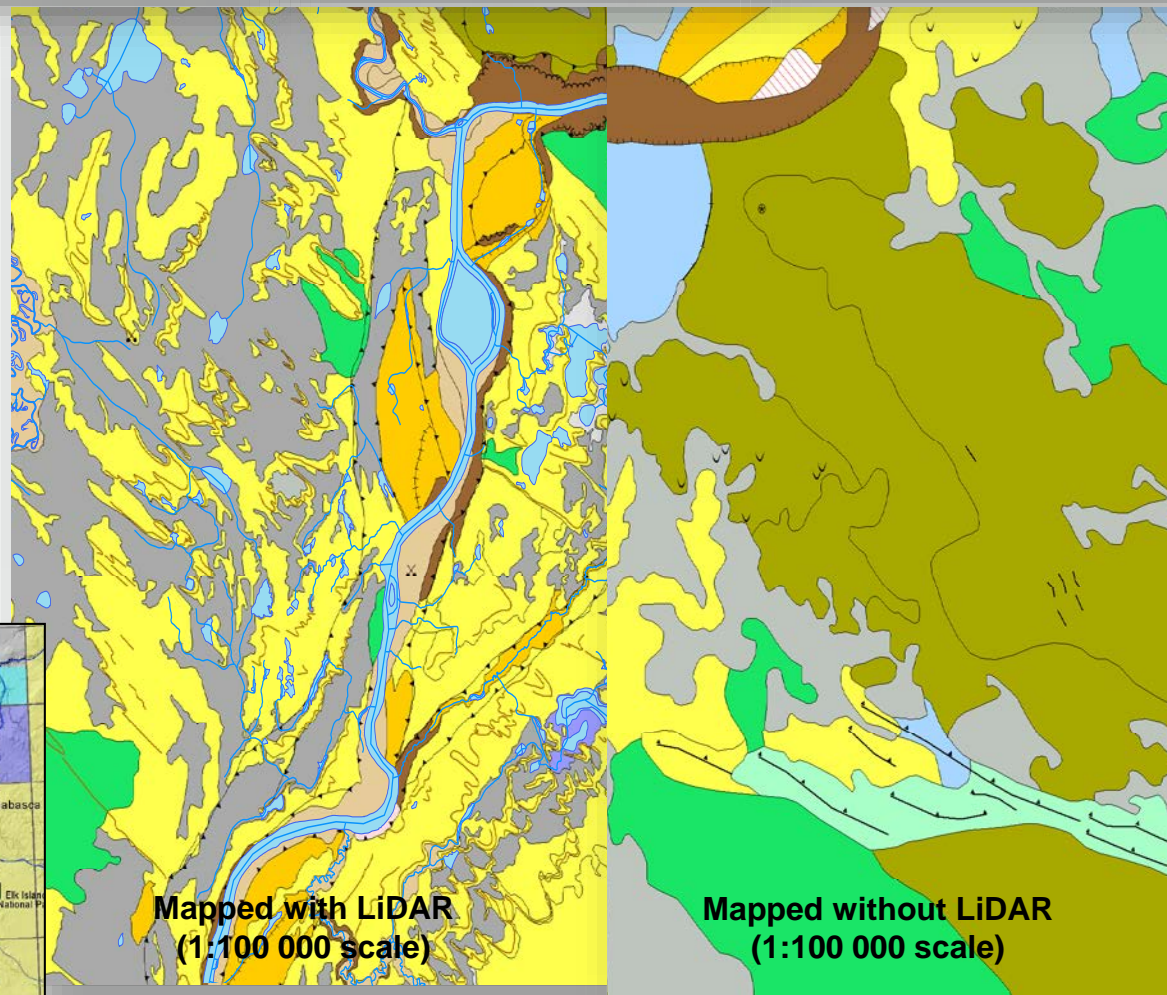
LiDAR



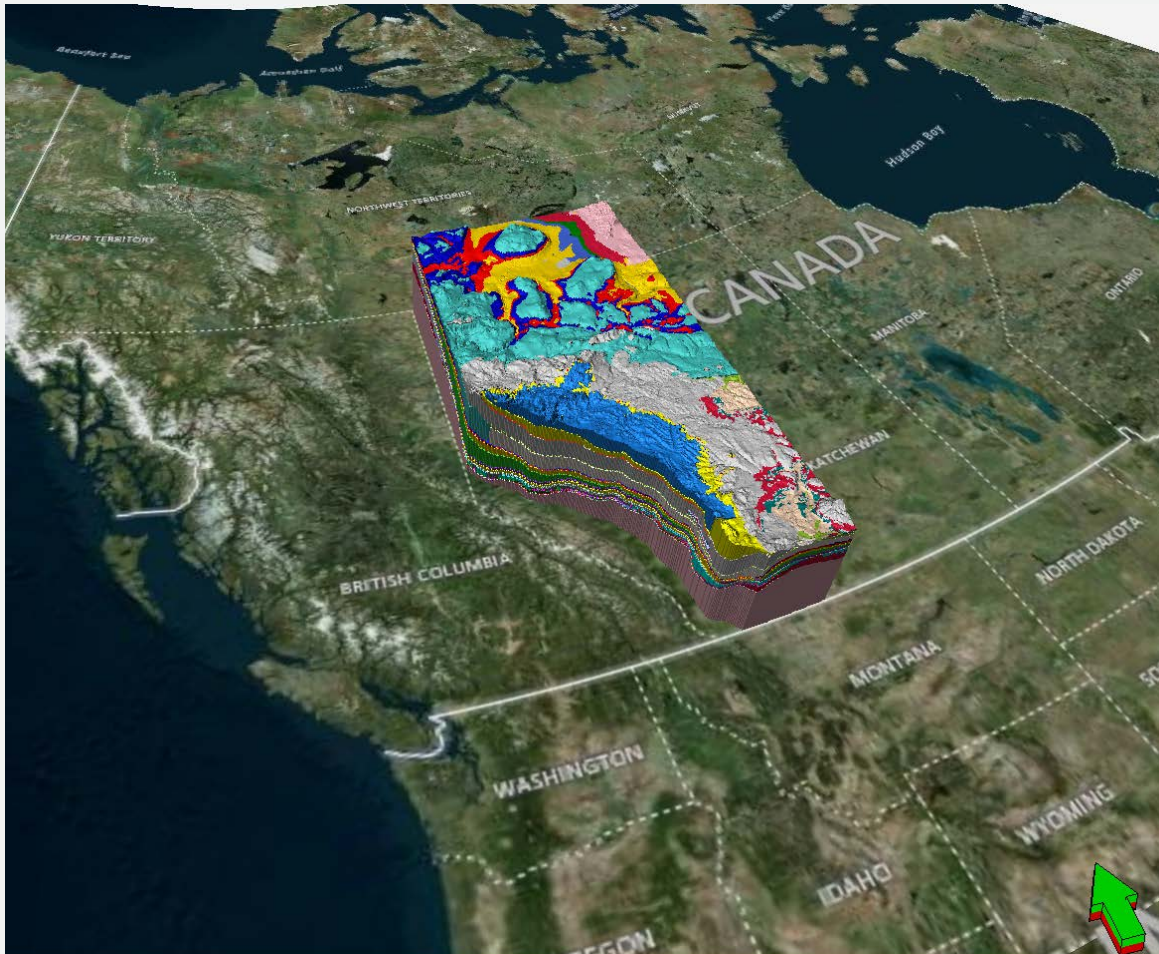
Heads-up image analysis

Technological Developments

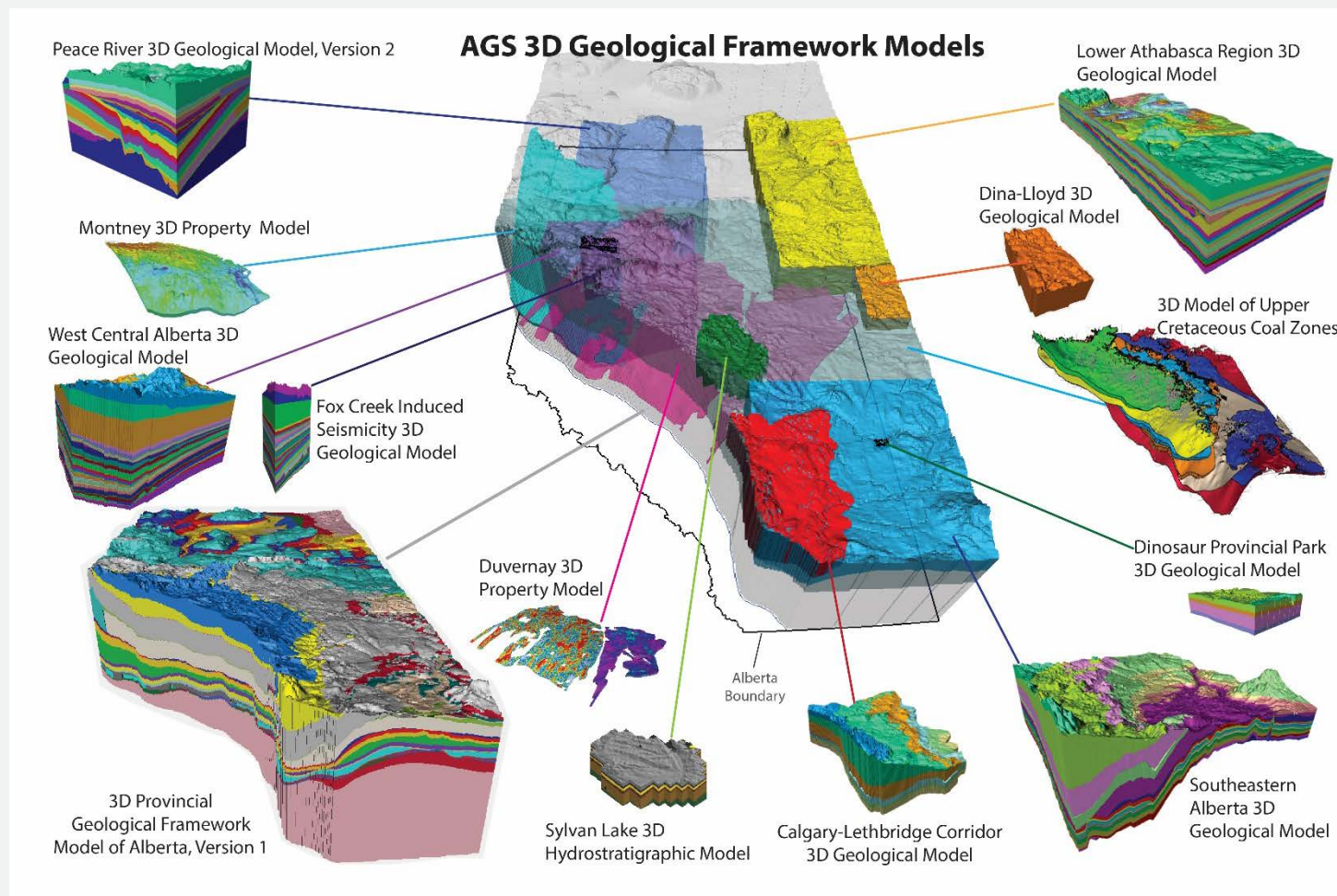
- Targeted/focused ground truthing
- Combination of digitization and semi-automated tools
- More accurate placement of geological boundaries



3D Geological Framework Program



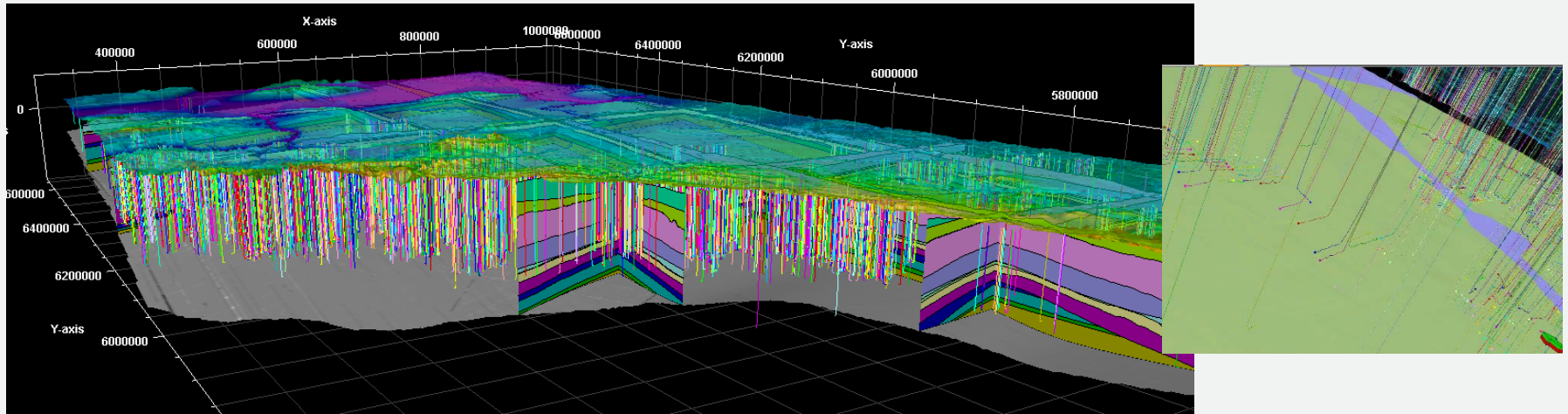
3D Geological Framework Program



Supporting Data Transparency for Information Integration

- › Manage and Efficiently Evaluate Well Data
 - › **450,000+ wells** (541,000 Km)
 - › Support science-based decision making
 - › Identify resource potential

13.5 x



Integrated and Interactive Geological Information

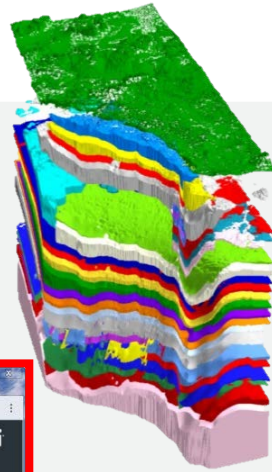
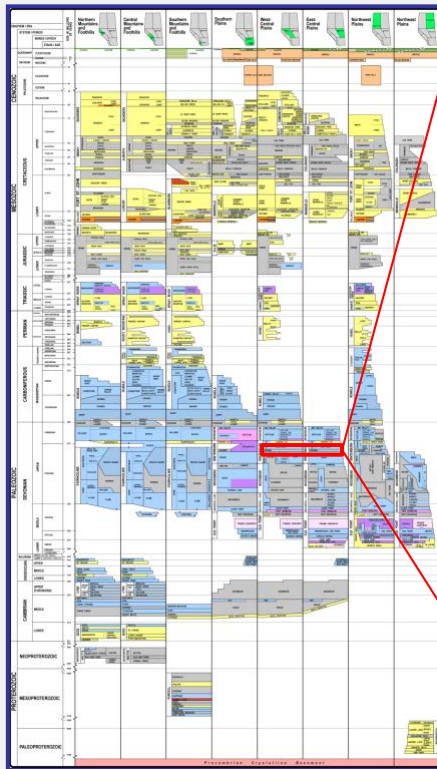
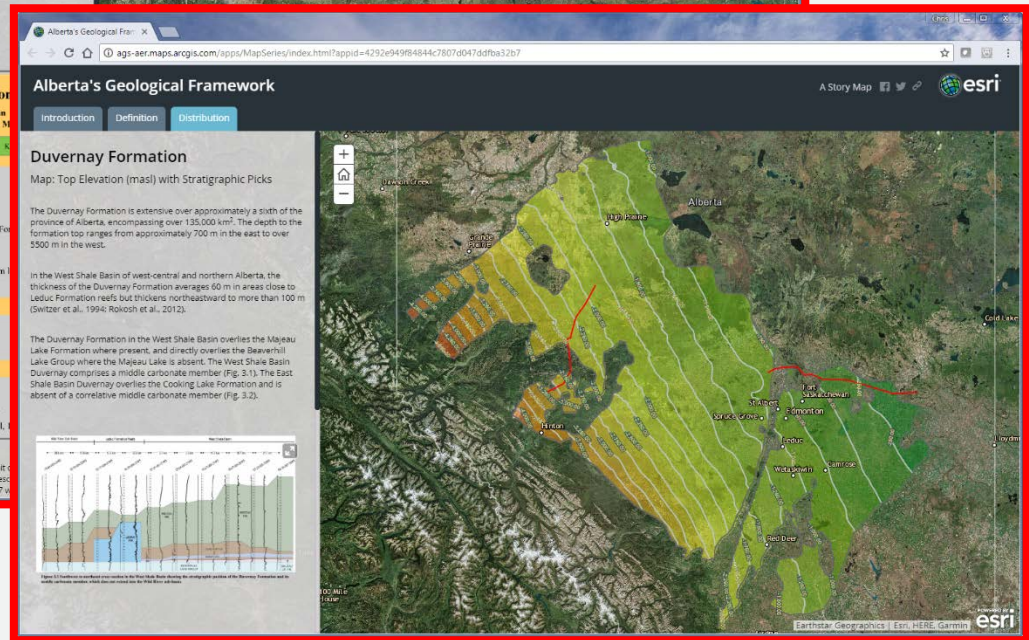
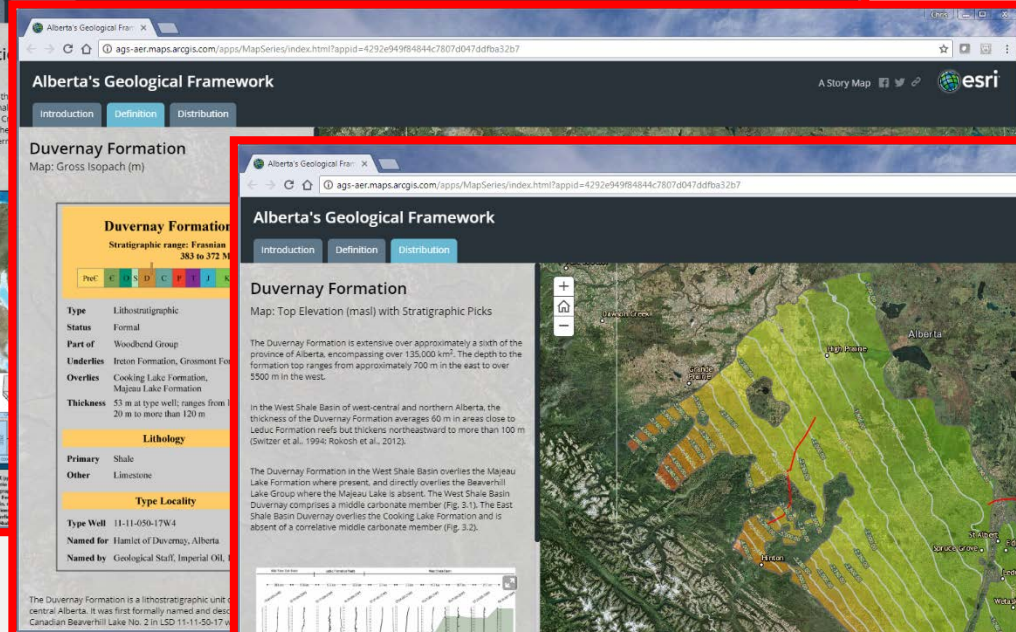
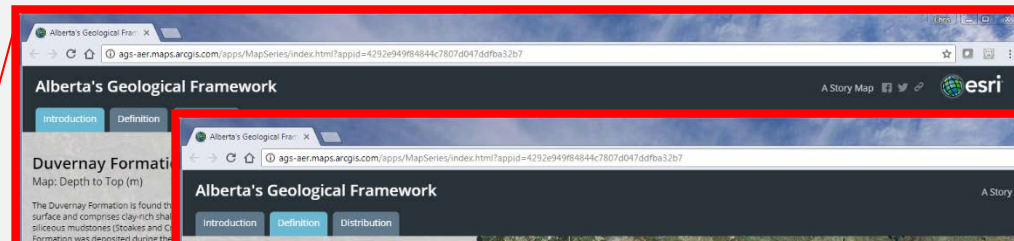


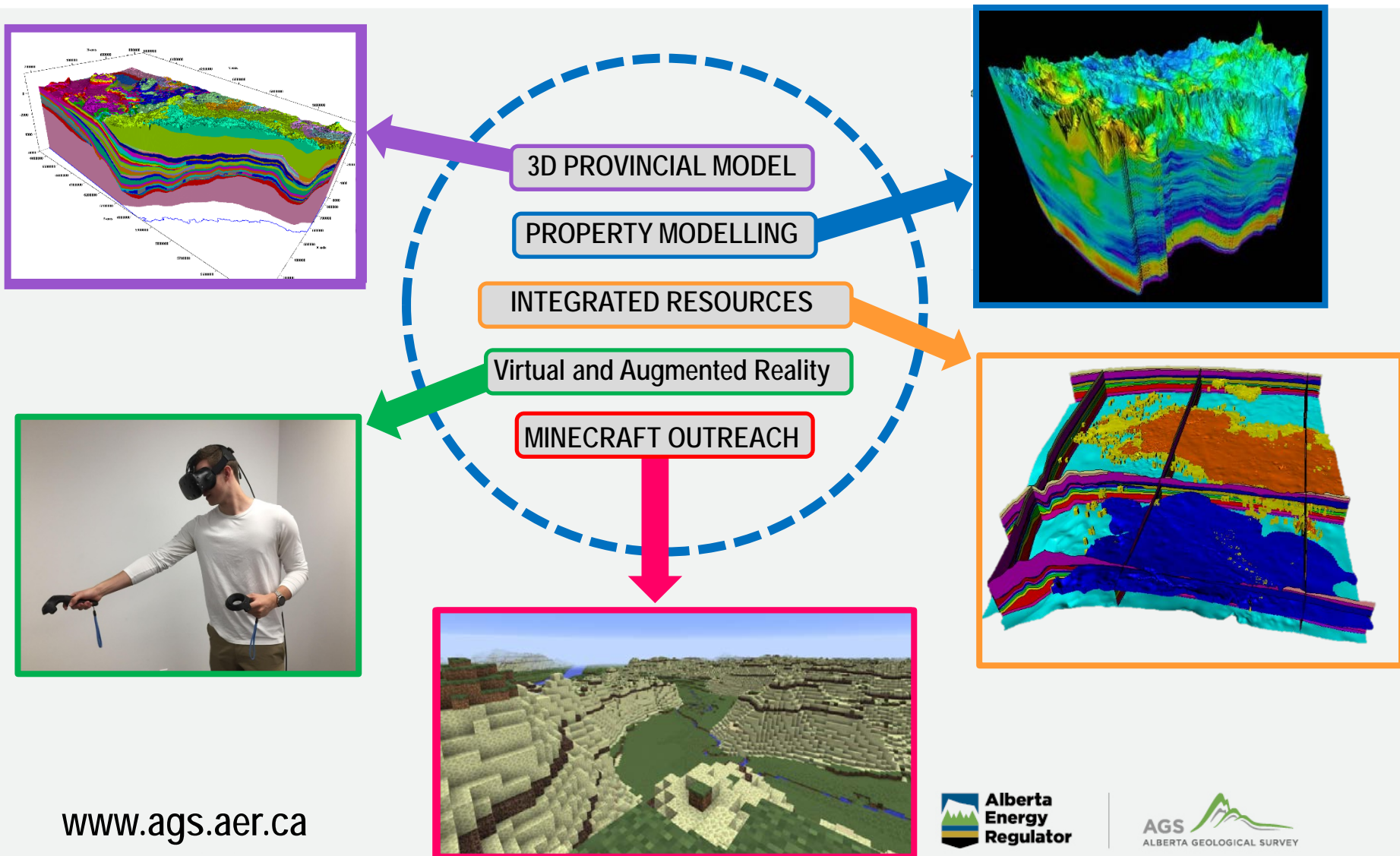
Table of Formations



Online Stratigraphic Unit Summaries



Geological Framework Activities



Value of Integrated Resource Modelling



Disseminating 3D Model Information

Publishing our Geomodels

- top/pick datasets
- geological extents
- 2.5D surfaces

IMOD

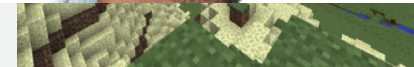
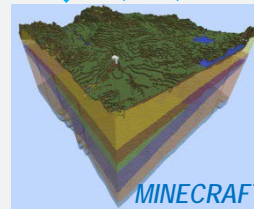
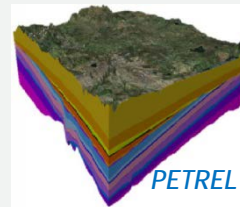
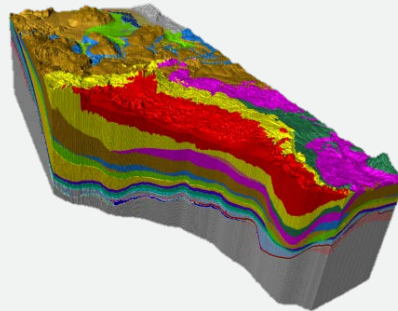
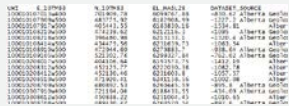
Entire geocellular model
available via free IMOD
software

MINECRAFT

Downscaling and transformation of Petrel models into Minecraft worlds

VIRTUAL REALITY

360 video tours of 3D Models and Minecraft models



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Thank You

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