

The background features a gradient from green at the top to blue at the bottom, with a starry or particle-like texture. On the left side, there are several concentric circular patterns and a large arc with a scale ranging from 140 to 260. Some of the circles have arrows indicating a clockwise direction. The title text is positioned on the right side of the image.

FLUVIAL GEOMORPHOLOGY: CHANNEL FORMS

ZACH HILGENDORF

OBJECTIVES

- Understand What Drives the 4 Basic Channel Forms
- Understand How to Tell Them Apart From Above

The geo-nerd currently talking...



CHANNEL FORM

STRAIGHT CHANNELS

- Single channel stream
- Relatively static
- Limited by combination of:
 - Low energy availability
 - High bank strength
- Often constrained by underlying geology



Made with Geemap
([link in comments](#))

MEANDERING CHANNELS

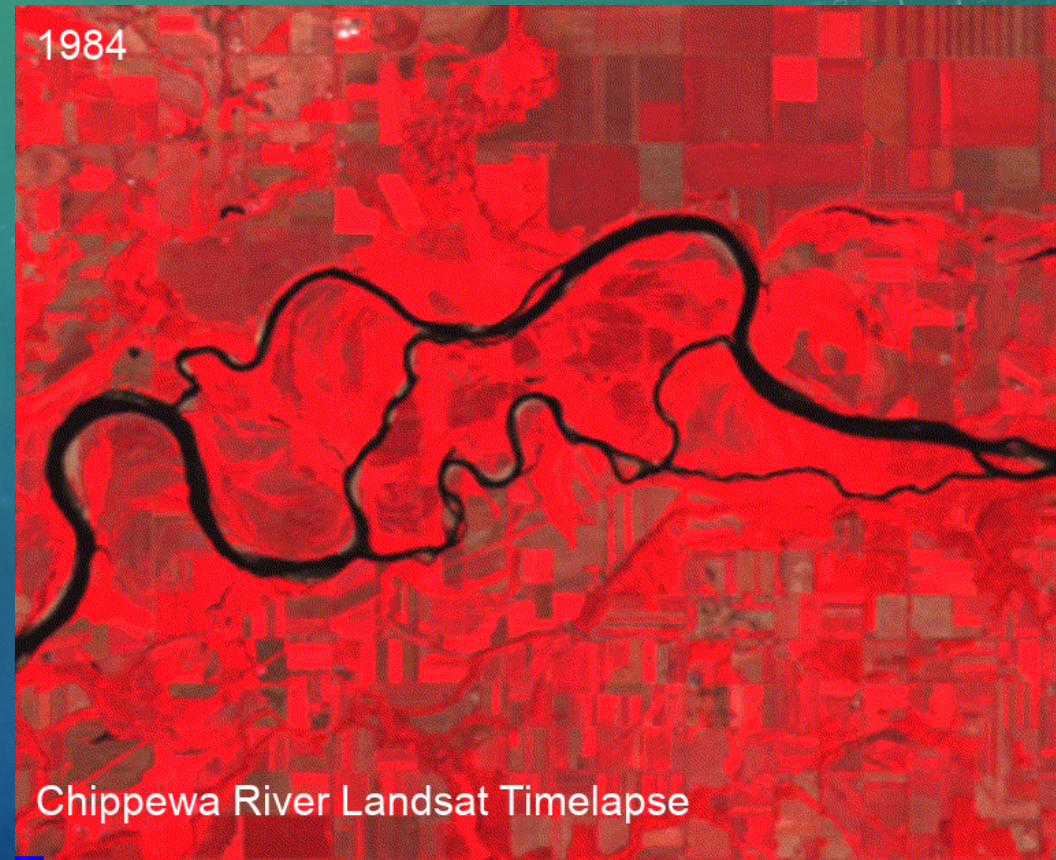
- Single channel stream
- Variable migration rates
- Associated with moderate stream power
- Typical features include scroll bars, point bars, and cut banks



Made with Geemap
([link in comments](#))

ANASTOMOSING CHANNELS

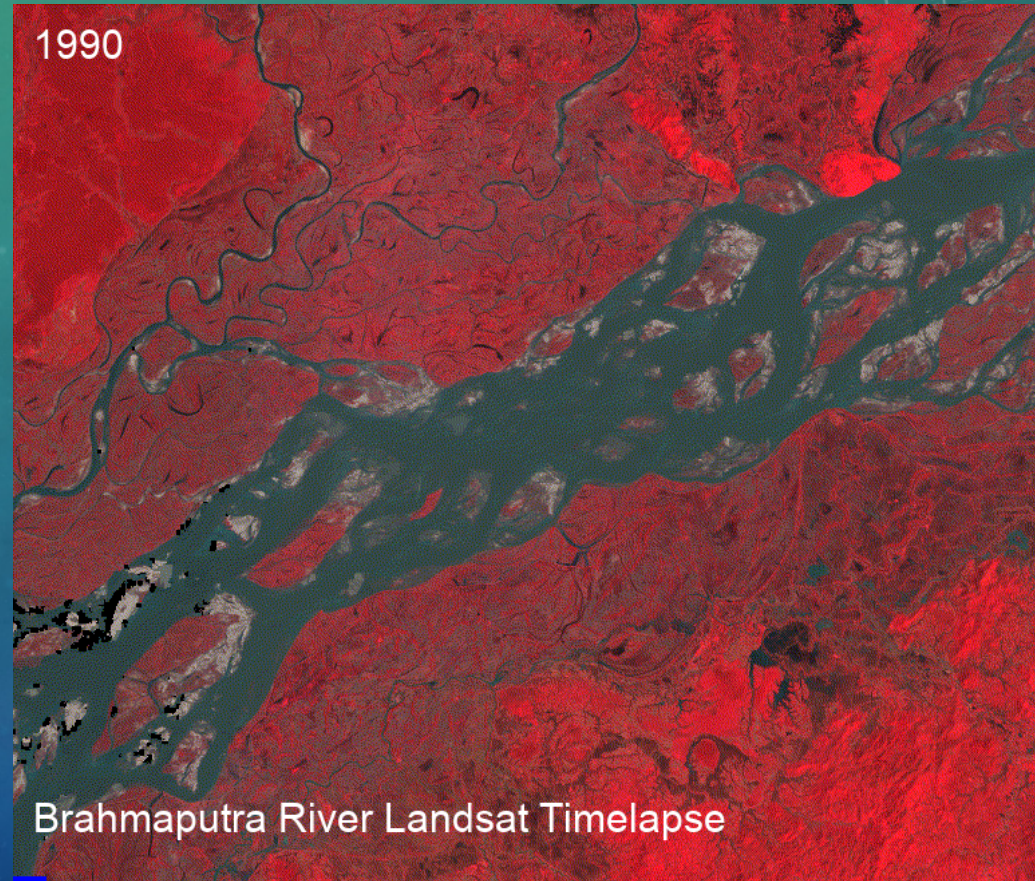
- Flow divided into 2+ channels
- Migration rates typically low
- Low slopes vs. discharge
- High discharge vs. sediment load



Made with Geemap
([link in comments](#))

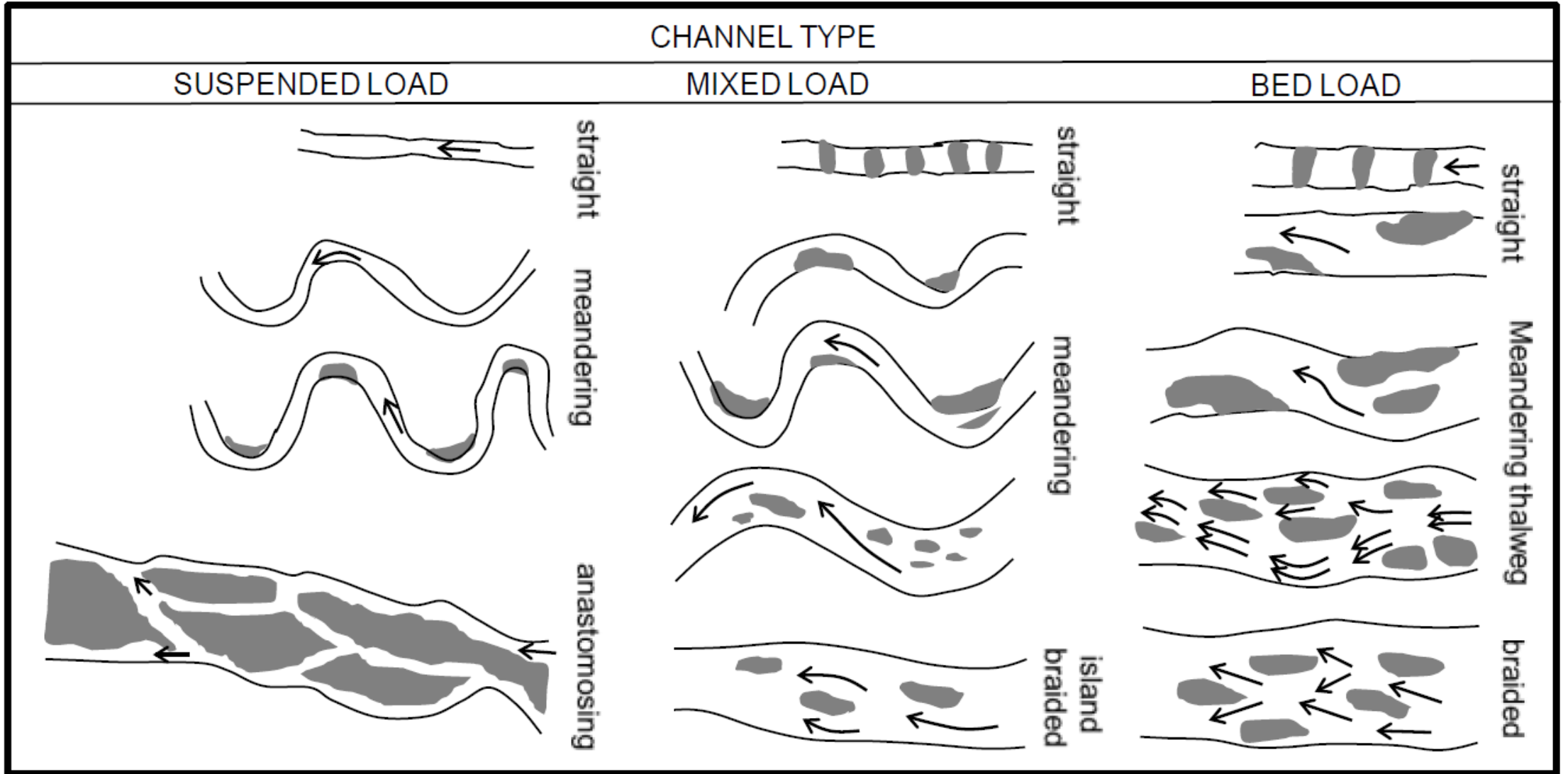
BRAIDED CHANNELS

- Wide, shallow channels
- Abundant supply of sediment
- High rates of energy expenditure
- Often have steep slopes
- Highly dynamic



Made with Geemap
([link in comments](#))

high ←———— RELATIVE STABILITY —————→ low
 low ←———— BED LOAD/TOTAL LOAD RATIO —————→ high
 small ←———— SEDIMENT LOAD —————→ large
 small ←———— SEDIMENT SIZE —————→ large



EXAMPLES WITH AERIAL IMAGERY

Minnesota River, Minnesota, USA



Flow

2837 m

Google Earth

Minnesota River, Minnesota, USA

PAUSE

Flow



2837 m

Google Earth

Minnesota River, Minnesota, USA

Meandering



Flow



2837 m

Google Earth

Minnesota River, Minnesota, USA

Meandering

Flow



2837 m

Google Earth

Lena River, Russia



Flow →

Image Landsat / Copernicus

Google Earth

36 km

Lena River, Russia

PAUSE


Flow 

Image Landsat / Copernicus

Google Earth

36 km

Lena River, Russia

Straight



Flow →

Image Landsat / Copernicus

Google Earth

36 km

Magdalena River, Columbia

Flow

5.15 km

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Image Landsat / Copernicus
Image © 2020 CNES / Airbus

Google Earth



Magdalena River, Columbia

PAUSE

Flow

5.15 km

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Image © 2020 CNES / Airbus

Google Earth

Magdalena River, Columbia

Anastomosing



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Image © 2020 CNES / Airbus

Google Earth

Waimakariri River, New Zealand



Flow

Image © 2020 Maxar Technologies

Google Earth

1487 m

Waimakariri River, New Zealand

PAUSE

Flow



Image © 2020 Maxar Technologies

Google Earth

1487 m

Waimakariri River, New Zealand

Braided



Image © 2020 Maxar Technologies

Google Earth

Columbia River, British Columbia

Flow



5.50 km

Image © 2020 Maxar Technologies
Image © 2020 Province of British Columbia
Image © 2020 CNES / Airbus

Google Earth

Columbia River, British Columbia

PAUSE

Flow



5.50 km

Image © 2020 Maxar Technologies
Image © 2020 Province of British Columbia
Image © 2020 CNES / Airbus

Google Earth

Columbia River, British Columbia

Anastomosing



Flow



5.50 km

Image © 2020 Maxar Technologies
Image © 2020 Province of British Columbia
Image © 2020 CNES / Airbus

Google Earth

Stream Draining Hoffelsjökull, Iceland



Flow

Image © 2020 CNES / Airbus

Google Earth

1324 m

Stream Draining Hoffelsjökull, Iceland

PAUSE

Flow



Image © 2020 CNES / Airbus

Google Earth

1324 m

Stream Draining Hoffelsjökull, Iceland

Braided



Flow

Image © 2020 CNES / Airbus

Google Earth

1324 m

Metauro River, Italy



Metauro River, Italy

PAUSE

Villa Falcineto

Falcineto Castracane

Caminate

Flow

1534 Cerbara

© 2020 Google

Google Earth



Metauro River, Italy

Straight



Chindwin River, Myanmar (Burma)

Flow



23.5 km

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Image © 2020 Maxar Technologies
Image Landsat / Copernicus

Google Earth

Chindwin River, Myanmar (Burma)

PAUSE

Flow



23.5 km

Image © 2020 CNES / Airbus
Image © 2020 Maxar Technologies
Image Landsat / Copernicus

Google Earth

Chindwin River, Myanmar (Burma)

Meandering

Flow



23.5 km

Image © 2020 CNES / Airbus
Image © 2020 Maxar Technologies
Image Landsat / Copernicus

Google Earth

Straight



Meandering



Anastomosing



Braided



River Channel Patterns: Braided, Meandering and Straight

By LUNA B. LEOPOLD *and* M. GORDON WOLMAN

PHYSIOGRAPHIC AND HYDRAULIC STUDIES OF RIVERS

GEOLOGICAL SURVEY PROFESSIONAL PAPER 282-B