

The background features a series of overlapping, wavy, paper-like layers in various shades of blue and white, creating a sense of depth and movement. The layers curve and fold, with some appearing to be in the foreground and others receding into the background. The overall color palette is dominated by deep blues and bright whites, with some lighter blue accents.

Fractional Crystallization



I notice/I wonder



S-P Crater

Magma Types

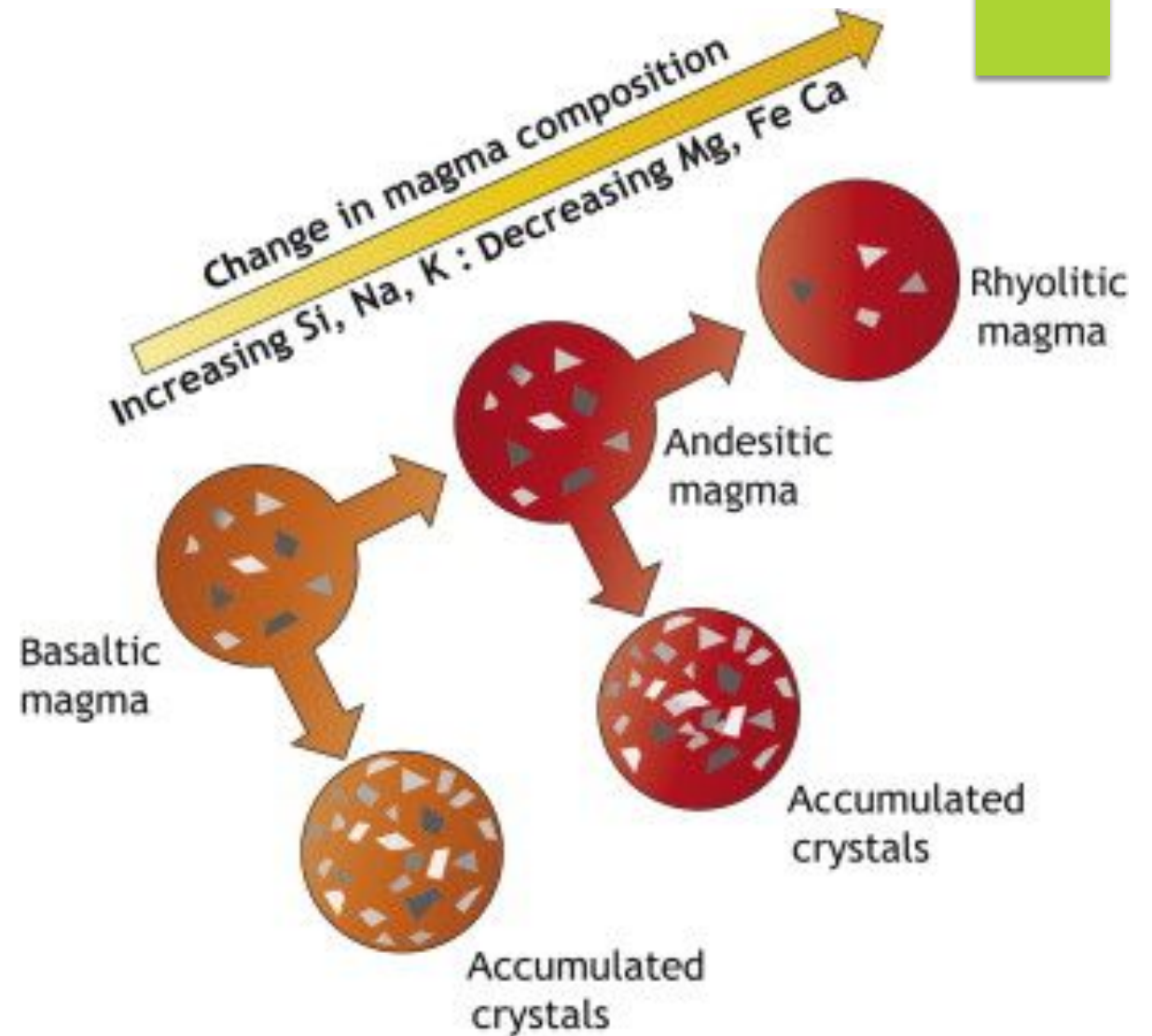
- ▶ **Ultramafic:** mostly olivine and pyroxene, **very high melting point**, mantle material
- ▶ **Mafic:** high in iron, calcium, and magnesium, less olivine more amphibole than ultramafic, **high melting point**
- ▶ **Intermediate:** high in biotite mica and potassium feldspar, **medium melting point**
- ▶ **Felsic:** high in silica, potassium, and sodium, high in quartz, muscovite mica, and potassium feldspar, **low melting point**
- ▶ Questions:
 - ▶ How do you think magma changes from ultramafic magma from the mantle to felsic magma?
 - ▶ What patterns do you notice?

Fractional Crystallization

- ▶ As magma moves toward the surface, the temperature decreases allowing it to cool.
- ▶ Higher melting point minerals will crystallize out first and sink.
- ▶ Each time it cools, more minerals crystallize out.
- ▶ Questions:
 - ▶ What types of magmas have the higher melting points?
 - ▶ Based on this, what types of minerals do you think would crystallize out first?

Changing Magma Composition

- ▶ As magma moves towards the surface, it has an increases in silica, sodium, and potassium and a decreases in magnesium, iron, and calcium.
- ▶ This allows for the formation of more intermediate and felsic magmas.



Why are There Sometimes Different Compositions Erupted at the Surface?

- ▶ Rate of Upwelling
 - ▶ Magmas can move quickly from extreme depths to the surface.
 - ▶ This process does not always allow time for minerals to crystallize out.
 - ▶ Therefore, when the rate of upwelling is fast, composition of the magma will not be impacted by fractional crystallization.
 - ▶ This allows for mafic to intermediate magmas to be produced.
- ▶ Pressure
 - ▶ As pressure decreases, melting increases resulting in less fractional crystallization.
 - ▶ This allows more mafic magmas to erupt at the surface, especially at mid-ocean ridges where pressure is low

References

Slide 2:

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Slide 3:

Anderson, Stephanie (2022). Photos of S-P Crater. Personal Collection.

Slide 6:

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