

Earthquakes, Volcanic Eruptions, and Country Voting within the United Nations General Assembly

Mariya Siliankina

EPPS 6356

Introduction

- What influences voting behavior?
 - Diplomatic relations
 - External factors
- United Nations General Assembly utilizes country voting extensively
- What factors cause more solidarity among U.N. member states?

Literature Review

- Natural disasters
 - Socio-economic disturbance
- Manage macroeconomic consequences
 - Mobilization of resources
 - Favorable financial conditions
- Foreign aid → soft power
- U.S. provides aid based on voting behavior
 - Apply this relationship

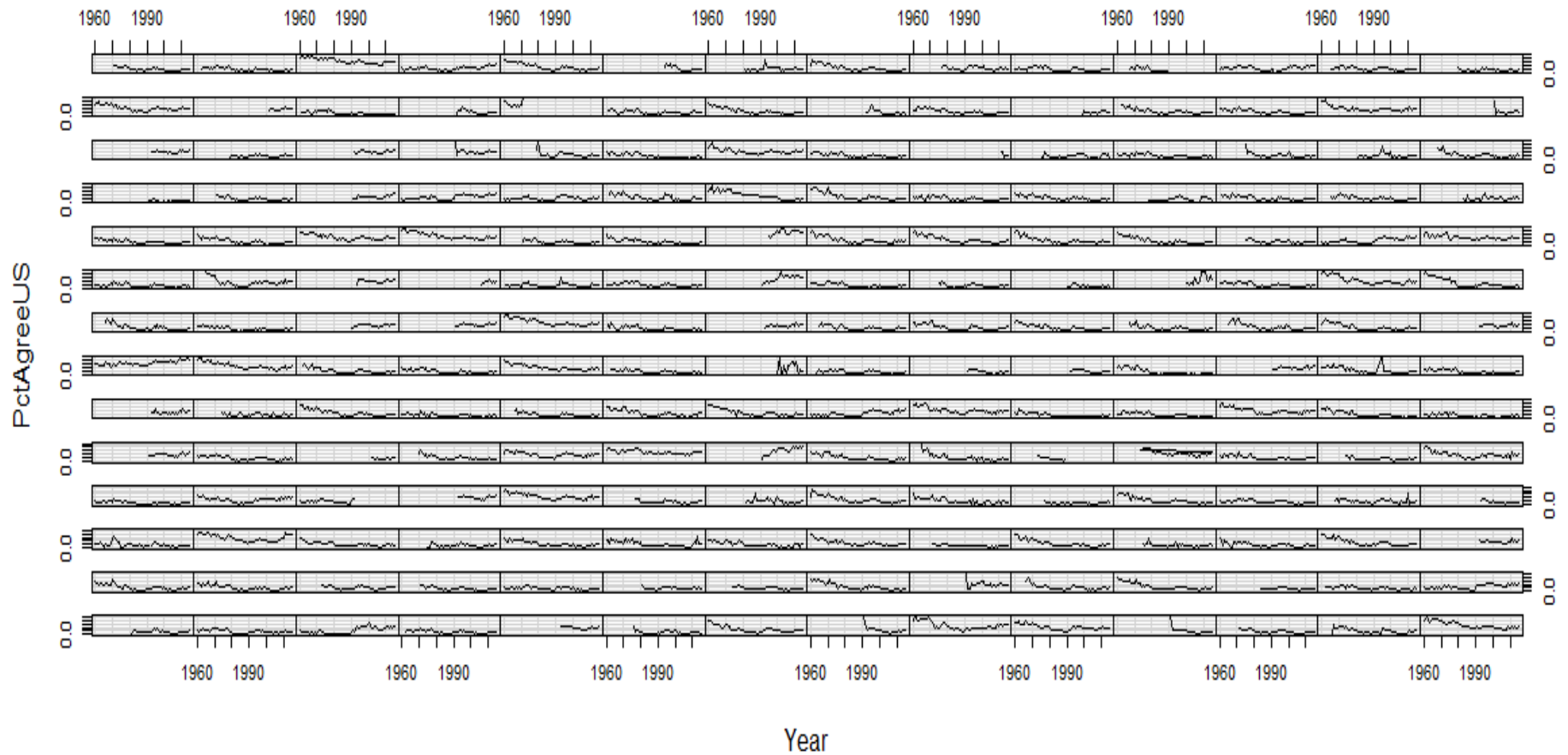
Research Statement

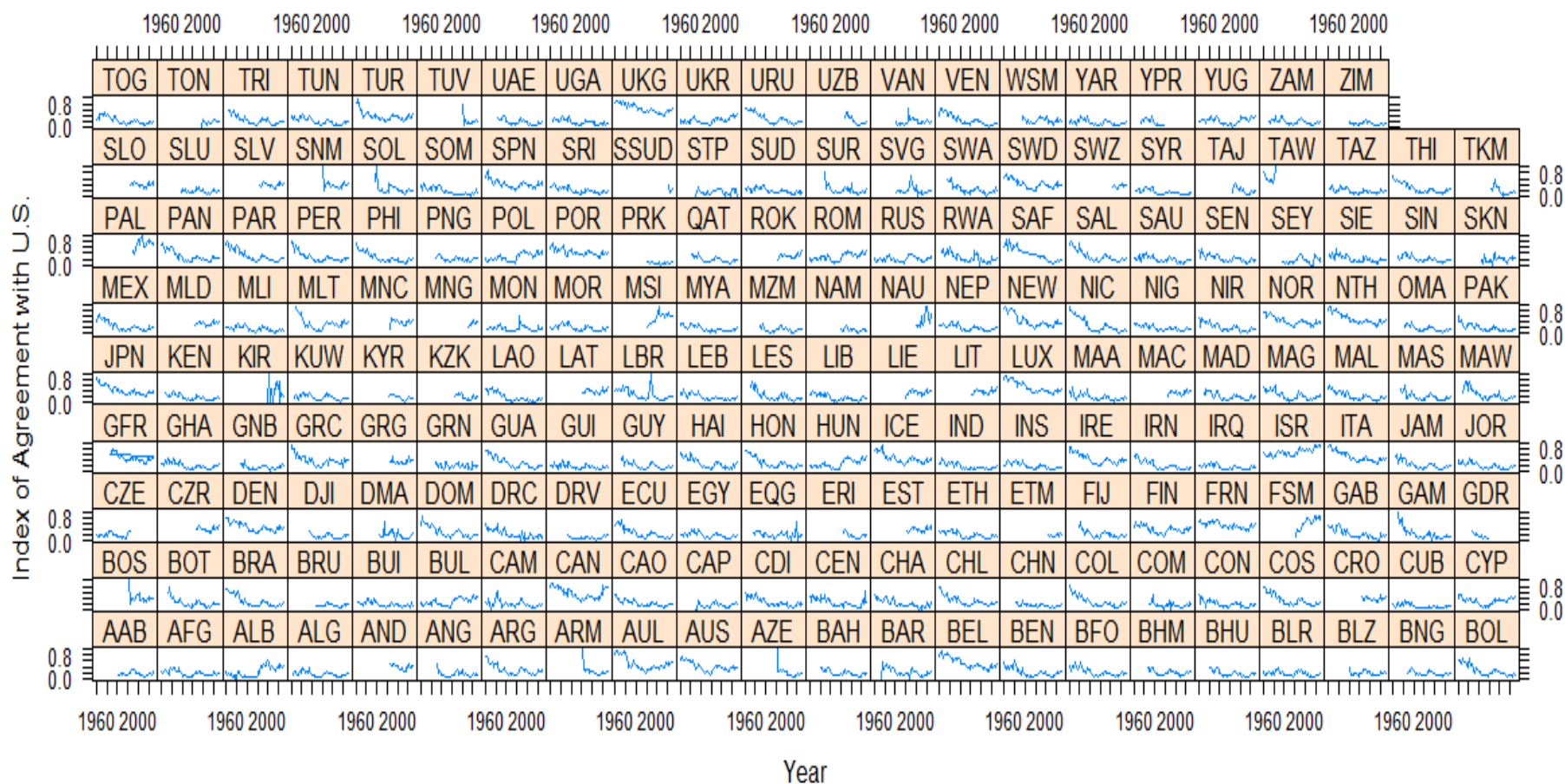
- Hypothesis 1:
 - U.N. member states that experience significant earthquakes and/or volcanic eruptions will be more likely to vote with the United States in the U.N. General Assembly during the same year.
 - Based on assumption that they need foreign aid

Panel Data

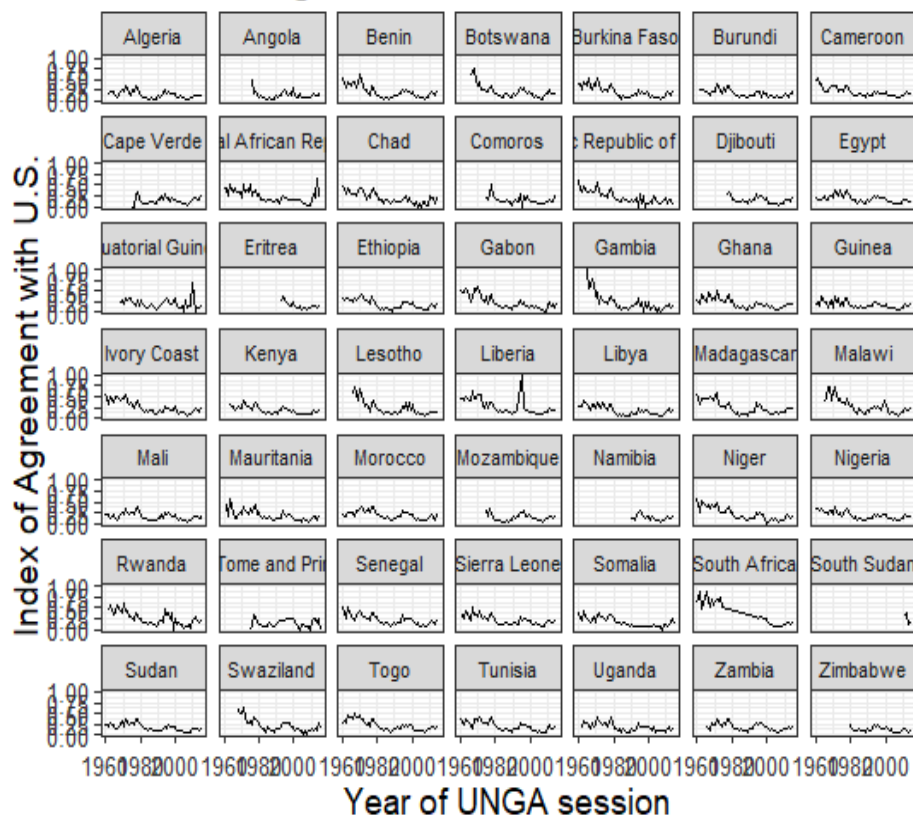
- Time: 1960-2015
- 196 U.N. member states
- Dependent variable:
 - Lijphart's index of agreement between a state & U.S.
- Independent variables:
 - Occurrence of a natural disaster(s) per year
 - Significant earthquakes and volcanic eruptions
- Control variables:
 - Polity score
 - GDP per capita
 - ODA donated by the U.S.

Testing Data Visualization Methods

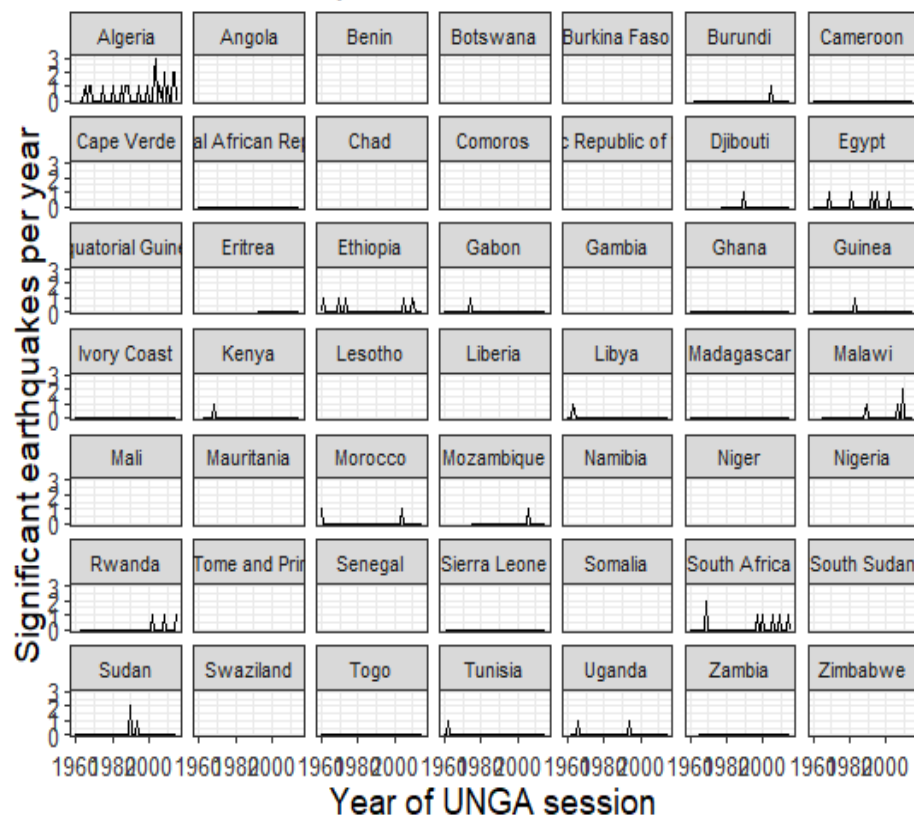




A Observed agreement of African states over time

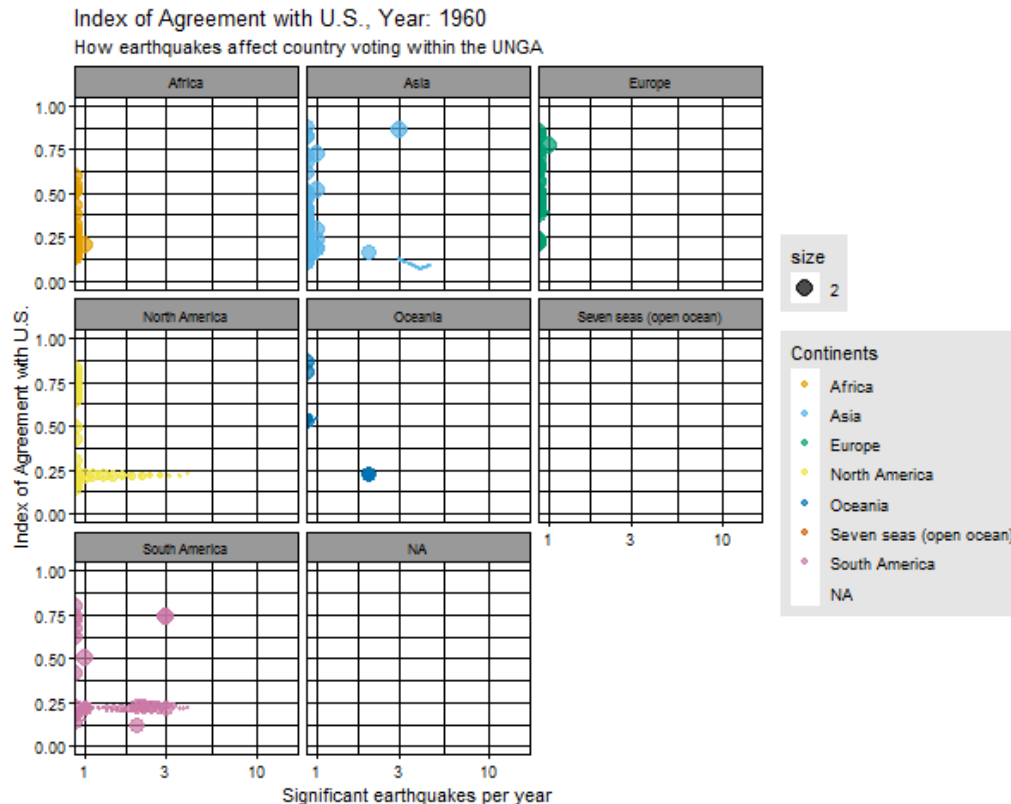


B Observed earthquakes in African states over time



Data Visualization Method

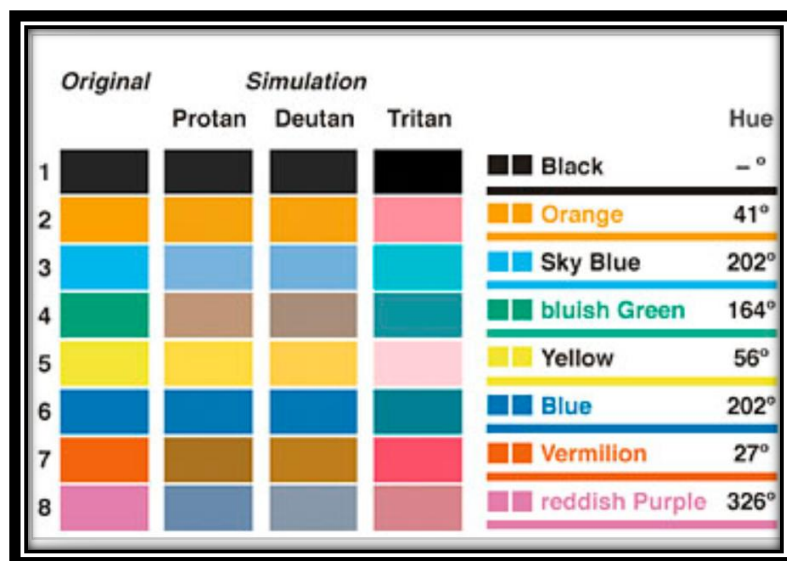
- Animate graphics



Data Sources: National Geophysical Data Center / World Data Service (NGDC/WDS): Significant Earthquake Database (n.d.).
Voeten, E., A. Strezhnev, and M. Bailey (2009).

Why this method?

- Customizable
- Color-blind-friendly palette
 - Unordered hues
 - Source: [http://www.cookbook-r.com/Graphs/Colors_\(ggplot2\)/](http://www.cookbook-r.com/Graphs/Colors_(ggplot2)/)



Why this method?

- Animation creates a compelling visualization
- Eye movement
 - Smooth-pursuit movements
 - Include preceding frames with gradual falloff
 - Easy to follow
 - Determine relationship between variables
- Visibility due to size of shapes

Data Visualization Method

View:

https://raw.githubusercontent.com/svmariya/svmariya.github.io/master/gganim_eq.gif

https://raw.githubusercontent.com/svmariya/svmariya.github.io/master/gganim_ve.gif

Results

- Utilized fixed effects model which corrected for heteroskedacity and serial correlation
- Data visualization effectively portrays results

	Estimate	Std. Error	Pr(> t)
Earthquakes (eq)	-0.0048	0.0035	0.1719
Volcanic Eruptions (ve)	-0.0078	0.0086	0.3658
Polity score (pol)	-0.0006	0.0004	0.1795
GDP per capita (gdp)	-0.0000	0.0000	0.0000
ODA (oda)	-0.0002	0.0001	0.0588

Table 1: Heteroskedasticity consistent coefficients (Arellano)

Conclusion

- Compelling animated ggplot
- Room for improvement
 - More user-friendly
 - Animated map with gradient scale
 - Animated circular visual where states move closer to center when their voting behavior supports the U.S.

References

- Becerra, O., E. Cavallo, and I. Noy (2014). "Foreign aid in the aftermath of large natural disasters". In: *Review of Development Economics* 18.3, pp. 445–460.
- Caruso, German Daniel (2017). "The legacy of natural disasters: The intergenerational impact of 100 years of disasters in Latin America". In: *Journal of Development Economics* 127, pp. 209–233.
- GDP per capita (current US\$) (2019). Last accessed 20 March 2019. url: <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?view=chart>.
- Healy, K., 2018. *Data visualization: a practical introduction*. Princeton University Press.
- Kadri, F., B. Birregah, and E. Chatelet (2014). "The impact of natural disasters on critical infrastructures: A domino effect-based study". In: *Journal of Homeland Security and Emergency Management* 11.2, pp. 217–241.
- National Geophysical Data Center / World Data Service (NGDC/WDS): Significant Earthquake Database (n.d.). Last accessed 23 February 2019. url: <https://doi:10.7289/V5TD9V7K>.
- National Geophysical Data Center / World Data Service (NGDC/WDS): Significant Volcanic Eruptions Database (n.d.). Last accessed 23 February 2019. url: <https://doi:10.7289/V5JW8BSH>.
- Net ODA by region from all donors combined database (2019). Last accessed 21 March 2019. url: <http://www.oecd.org/dac/stats/idsonline.htm>.
- Noy, I. (2009). "The macroeconomic consequences of disasters". In: *Journal of Development economics* 88.2, pp. 221–231.
- Polity IV Annual Time-Series, 1800-2017 (2018). Last accessed 20 March 2019. url: <http://www.systemicpeace.org/inscrdata.html>.
- Ritchie, H. and M. Roser (2019). "Natural Disasters". In: *Our World in Data*. <https://ourworldindata.org/natural-disasters>.
- Stromberg, D. (2007). "Natural disasters, economic development, and humanitarian aid". In: *Journal of Economic perspectives* 21.3, pp. 199–222.
- Voeten, E., A. Strezhnev, and M. Bailey (2009). United Nations General Assembly Voting Data. Version V18. doi: 10.7910/DVN/LEJUQZ. url: <https://doi.org/10.7910/DVN/LEJUQZ>.
- Wittkopf, E. R. (1973). "Foreign aid and United Nations votes: a comparative study". In: *American Political Science Review* 67.3, pp. 868–888.
- Yau, N., 2011. *Visualize this: the FlowingData guide to design, visualization, and statistics*. John Wiley & Sons.

Code

```
mapping1 <- aes(x =EQ, y = PctAgreeUS, size=2, colour = Continents, frame = Year)
cbPalette <- c("#E69F00", "#56B4E9", "#009E73", "#F0E442", "#0072B2", "#D55E00", "#CC79A7")
anim <- ggplot(world_data4, mapping = mapping1) +
  geom_point(alpha = 0.7) +
  theme_linedraw() +
  scale_x_log10() +
  scale_color_manual(values=cbPalette) +
  facet_wrap(~Continents) +
  theme(strip.text.x = element_text(size=8, colour="black"),
        strip.background = element_rect(fill="#999999"),
        plot.caption = element_text(face = "italic", hjust = 0)) +
  labs(title = 'Index of Agreement with U.S., Year: {as.integer(frame_time)}',
        subtitle = "How earthquakes affect country voting within the UNGA",
        x = 'Significant earthquakes per year',
        y = 'Index of Agreement with U.S.',
        caption = "Data Sources: National Geophysical Data Center / World Data Service (NGDC/WDS): Sig-
nificant Earthquake Database (n.d).
Voeten, E., A. Strezhnev, and M. Bailey (2009).") +
  transition_time(Year) +
  ease_aes('linear') +
  shadow_wake(wake_length = 0.05, alpha = FALSE) +
  theme(legend.background = element_rect(fill="gray90", size=.5, linetype="dotted"))
animate(anim, fps = 30, width = 600, height = 500, duration=20,
  renderer = gifski_renderer("gganim_eq.gif"))
```