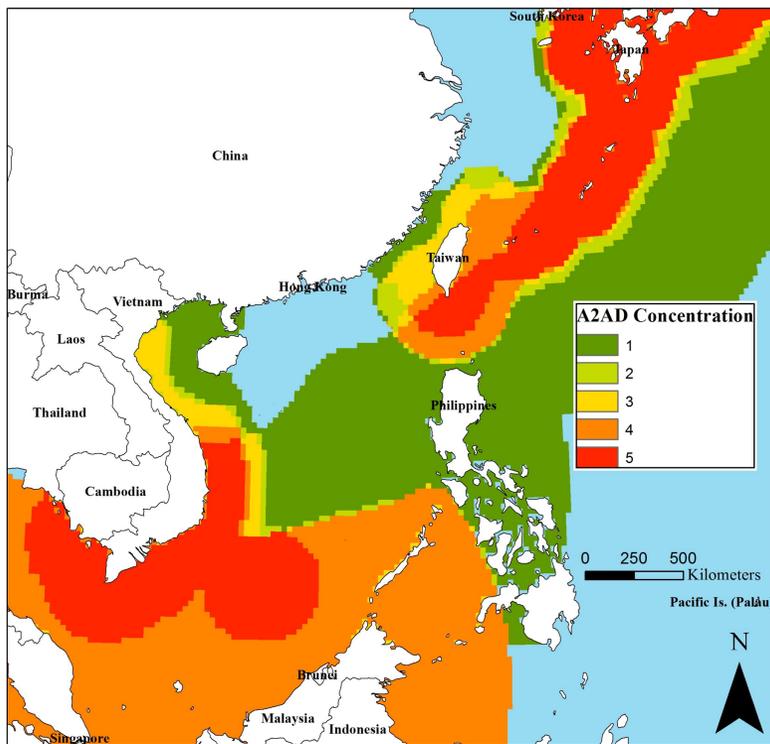


# The Limits of Chinese Naval Power

## Part 2: Capabilities of China's Maritime Neighbors

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### Introduction

China's aggressive military activities and political rhetoric in its near seas have encouraged its maritime neighbors to increase their military presence and readiness. Japanese politicians such as Prime Minister Shinzo Abe have pushed for constitutional changes to improve their state's military capabilities and allow for increased defense spending. Vietnamese leaders have improved trade and defense relations with the United States and India in order to purchase more A2AD weapon systems. Taiwan, Indonesia, and Malaysia have all followed suit.

We used IHS Jane's data to catalog the ranges of A2AD systems including: shore-based anti-ship missiles, fighter aircraft, submarines, warships, and missile boats/fast attack craft for each of these five countries (along with the missile ranges of each platform). By visualizing and geospatially analyzing these capabilities, we show how China's ability to project power into the ECS and SCS has become largely overestimated.

### Methodology

In order to represent the A2AD zones for each of China's maritime neighbors, we need the following data for China, Japan, Taiwan, Vietnam, Indonesia, and Malaysia: 1) shore-based AShM ranges, 2) fighter aircraft combat radii, 3) Surface-to-Air Missile ranges, 4) submarine ranges, 5) Anti-Submarine Warfare helicopter ranges, 6) warship ranges, 7) missile boat/fast attack craft ranges, and 8) ranges of the missiles fired from each platform. We also need a polygon-vector layer for each country and point vector layers for each state's naval and air bases. Our output is five buffers for each maritime neighbor, with each buffer covering the areas where that country's fighter aircraft, warships, missile boats, submarines, or shore-based AShM can counter Chinese maritime vessels and aircraft. We define these areas as those in which Japan, Taiwan, Vietnam, Indonesia, and Malaysia's military platforms can operate in relative safety plus the areas into which said platforms can hit with missiles.

Shore-based AShM zones are simply buffers around Japan, Taiwan, and Vietnam reflecting the missile ranges of these systems.

For fighter aircraft zones, we need buffers around China, Japan, Vietnam, and Taiwan of each country's Surface-to-Air Missile (SAM) range. We then union each country's SAM buffer to China's and select (by attribute) the polygons that are not within China's SAM zone. These are the fighter "safe zones" for Japan, Vietnam, and Taiwan. We then buffer Chinese, Indonesian, and Malaysian air bases using the combat radii of each country's fighter. Following, we union these fighter buffers and select (by attribute) polygons that are not within the Chinese fighter radii. These polygons represent the fighter "safe zones" for Indonesia and Malaysia. We add another buffer around each country's fighter "safe zone" to represent the missile range of each platform. These buffers reflect fighter aircraft A2AD coverage of China's maritime neighbors.

For submarine zones, we need a buffer around China reflecting the combat radius of its Anti-Submarine Warfare (ASW) helicopters. We then need buffers based on Japanese and Vietnamese submarine bases, reflecting the submarine ranges of each country. Following, we union the Chinese ASW buffer with the Japanese and Vietnamese submarine range buffers and select (by attribute) polygons that are not within the Chinese ASW radii. These are the submarine "safe zones" of Vietnam and Japan. We buffer around each country's submarine "safe zone" to represent the missile range of each platform. These buffers reflect submarine A2AD coverage of China's maritime neighbors.



Source: Wikimedia

For warship zones, we need buffers around Japan, Taiwan, and Vietnam of each country's SAM range and a buffer around China representing its shore-based AShM range. We then union the SAM buffer of each country to China's AShM buffer and select (by attribute) polygons that are not within the Chinese shore-based AShM buffer. These are the warship "safe zones" for Japan, Taiwan, and Vietnam. We then buffer Malaysian and Indonesian naval bases using the range of each country's warships. Following, we union this buffer to the Chinese fighter aircraft buffer and select (by attribute) polygons that are not within the Chinese fighter aircraft polygon. These are the "safe zones" for Indonesian and Malaysian warships. We then buffer around each country's warship "safe zone" to represent the missile range of each platform. These buffers reflect warship A2AD coverage of China's maritime neighbors.

As previously mentioned, missile boats are vulnerable to Chinese fighter aircraft and submarines and therefore tend to stay within their country's SAM safe zones. Thus we can reuse the fighter aircraft "safe zone" polygons. We then buffer around each country's "safe zone" to represent the missile range of each platform. These buffers reflect missile boat A2AD coverage of China's maritime neighbors.

We now have all five A2AD zones. In order to better illustrate how these layers interact, we can convert them into rasters and use the raster calculator to combine them.

### Results

These maps clearly demonstrate that Japan, Taiwan, Vietnam, Indonesia, and Malaysia possess significant military capacity to deter, and if necessary, counter Chinese forces in the ECS and SCS. One key takeaway from these maps is the *variety* of potent A2AD systems that China's maritime neighbors could use in a conflict. Even if China can target more fighter aircraft or submarines than our research assumes, other platforms would remain active. It would still be especially dangerous for China to send large warships deep into the disputed zones, yet it would need to deploy such vessels to these areas to control them. Furthermore truck-mounted AShM would be very difficult for China to locate and destroy, and failing to do so in a maritime conflict could severely impinge its capacity to project power. It may appear that China faces fewer difficulties in the disputed areas of the ECS than in the massive SCS. However, it is important to note the higher quality of training and equipment in the Japanese and Taiwanese militaries which make them more than capable opponents.

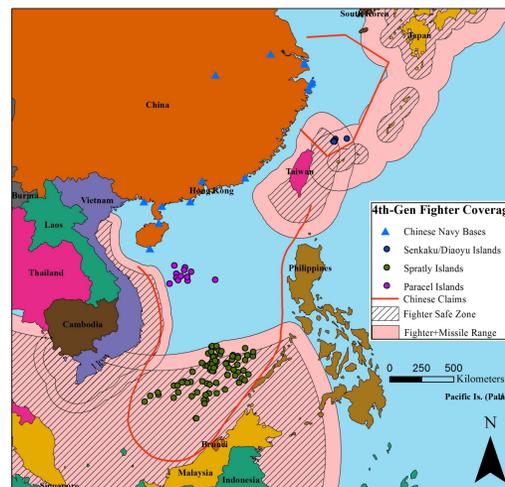
These maps also lead to two important political conclusions. First, these maps imply that China's maritime neighbors would be better off cooperating in the event of a conflict. It would be much easier for China to suppress its neighbors' A2AD capabilities individually rather than at the same time. Therefore if a maritime war were imminent, China would seek to diplomatically isolate whichever power it was likely to engage. Additionally, although there is a broad trend in scholarship on East Asian security to examine conflicts through U.S.-China or at best U.S.-China-Japan or U.S.-China-Taiwan paradigms, these are problematic approaches. These maps show that China's maritime neighbors have significant A2AD capability *without U.S. involvement*. East Asian security must be viewed through a multilateral paradigm.

GIS 101/ENV 107: Intro to GIS, 5/10/17  
Data from IHS Jane's, IISS, CSIS/GeoEye, Tufts M:\ Drive  
Coordinate System: Hong\_Kong\_1980\_UTM\_Zone\_50N  
Projection: Transverse Mercator



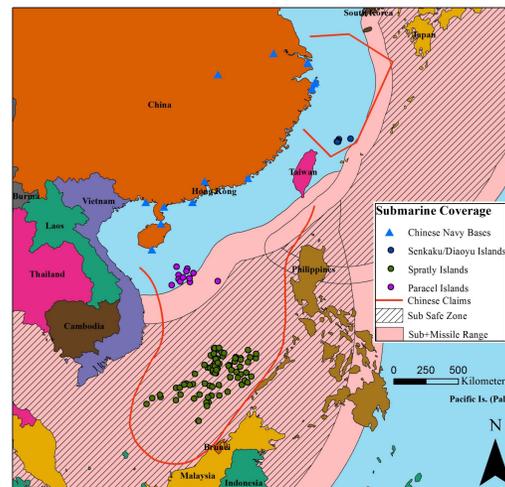
### Shore-Based Anti-Ship Missiles

Japan, Taiwan, and Vietnam are all equipped with Anti-Ship Missiles mounted on trucks. These weapons would be among the most problematic for the People's Liberation Army in the event of a maritime conflict. After all, since the U.S. Air Force was unable to neutralize truck-based missiles during the Balkan or Iraq wars, the Chinese Air Force has little hope of removing this threat from its well-trained neighbors. These weapons are accurate and long-ranged. Moreover, Vietnam has already deployed these missile launchers onto the Spratly Islands, making it very difficult for China to project power deep into the South China Sea in the event of a conflict.



### Fighter Coverage

We assume that China's maritime neighbors would be wary of Chinese fighters, especially the J-11. Japanese, Taiwanese, and Vietnamese aircraft will stay in "safe zones", defined here as areas covered by their Surface-to-Air Missile batteries. Indonesian and Malaysian aircraft would remain outside of the J-11 combat radius. From these safe zones, the fighter aircraft of China's maritime neighbors would still be able to fire Anti-Ship Missiles into the East and South China Seas, making it dangerous for Chinese ships to enter these waters in a conflict.



### Submarine Coverage

Japan and Vietnam have the most powerful submarine capabilities of China's maritime neighbors. These vessels have extremely long ranges, but are unlikely to travel under Chinese Anti-Submarine Warfare helicopters (Ka-28 Helix). However, as long as these submarines stay outside of the Ka-28 Helix combat radius, they could fire Anti-Ship Missiles and torpedoes at Chinese warships from relative safety and to potentially devastating effect.



### Warships

Warships from China's maritime neighbors would have to remain outside the range of Chinese Shore-Based Anti-Ship Missiles and would be unlikely to sail beneath skies dominated by Chinese fighters. But underneath their Surface-to-Air Missile "safe zones" and positioned outside of Chinese fighters' combat radii, these warships could fire Anti-Ship Missiles into most disputed areas or territories in the event of a conflict. Japanese warships in particular can accurately launch their Type 90 Ship-to-Ship Missiles up to 200km, making the East China Sea especially dangerous for larger Chinese vessels.



### Missile Boats/Fast Attack Craft

Cheap, fast, and deadly, the missile boat and fast attack craft of China's maritime neighbors would make any distant deployment of Chinese sea power quite dangerous. The speed of these boats, along with their small size and radar profile, would make them elusive targets for Chinese missiles. Although these smaller vessels are certainly vulnerable to Chinese aircraft and submarines, they could find shelter under the cover of their country's Surface-to-Air Missile shield and Anti-Submarine Warfare helicopters. From these "safe zones", fast attack craft and missile boats could harass Chinese vessels in a maritime conflict. Taiwan, which has more than forty of these missile boats, is particularly potent in this regard.